HITACHI

No. 0410

CM721FET

SERVICE MANUAL
MANUEL D'ENTRETIEN
WARTUNGSHANDBUCH

CAUTION:
Before servicing this chassis, it is important that the service technician read the "Safety Precautions" and "Product Safety Notices" in this service manual.

ATTENTION:
Avant d'effectuer l'entretien du châassis, le technicien doit lire les «Précautions de sécurité» et les «Notices de sécurité du produit» présentés dans le présent manuel.

VORSICHT:
Vor Öffnen des Gehäuses hat der Service-Ingenieur die „Sicherheitshinweise" und „Hinweise zur Produktsicherheit" in diesem Wartungshandbuch zu lesen.

Data contained within this Service manual is subject to alteration for improvement.

Les données fournies dans le présent manuel d'entretien peuvent faire l'objet de modifications en vue de perfectionner le produit.

Die in diesem Wartungshandbuch enthaltenen Spezifikationen können sich zwecks Verbesserungen ändern.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

MONITOR
December 2001

ENGLISH

SAFETY PRECAUTIONS

WARNING: The following precautions must be observed.

ALL PRODUCTS

Before any service is performed on the chassis an isolation transformer should be inserted between the power line and the product.

1. When replacing the chassis in the cabinet, ensure all the protective devices are put back in place.
2. When service is required, observe the original lead dressing. Extra precaution should be taken to ensure correct lead dressing in any high voltage circuitry area.
3. Many electrical and mechanical parts in HITACHI products have special safety related characteristics. These characteristics are often not evident from visual inspection, nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified by marking with a ⚠ on the schematics and the replacement parts list.
   The use of a substitute replacement component that does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list, may create electrical shock, fire, X-radiation, or other hazards.
4. Always replace original spacers and maintain lead lengths. Furthermore, where a short circuit has occurred, replace those components that indicate evidence of overheating.
5. Insulation resistance should not be less than 2M ohms at 500V DC between the main poles and any accessible metal parts.
6. No flashover or breakdown should occur during the dielectric strength test, applying 3kV AC or 4.25kV DC for two seconds between the main poles and accessible metal parts.
7. Before returning a serviced product to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock. The service technician must make sure that no protective device built into the instrument by the manufacturer has become defective, or inadvertently damaged during servicing.

CE MARK

1. HITACHI products may contain the CE mark on the rating plate indicating that the product contains parts that have been specifically approved to provide electromagnetic compatibility to designated levels.
2. When replacing any part in this product, please use only the correct part itemised in the parts list to ensure this standard is maintained, and take care to replace lead dressing to its original state, as this can have a bearing on the electromagnetic radiation/immunity.

PICTURE TUBE

1. The line output stage can develop voltages in excess of 25kV; if the E.H.T. cap is required to be removed, discharge the anode to chassis via a high value resistor, prior to its removal from the picture tube.
2. High voltage should always be kept at the rated value of the chassis and no higher. Operating at higher voltages may cause a failure of the picture tube or high voltage supply, and also, under certain circumstances could produce X-radiation levels moderately in excess of design levels. The high voltage must not, under any circumstances, exceed 29kV on the chassis (except for projection Televisions).
3. The primary source of X-radiation in the product is the picture tube. The picture tube utilised for the above mentioned function in this chassis is specially constructed to limit X-radiation. For continued X-radiation protection, replace tube with the same type as the original HITACHI approved type
4. Keep the picture tube away from the body while handling. Do not install, remove, or handle the picture tube in any manner unless shatterproof goggles are worn. People not so equipped should be kept away while picture tubes are handled

LASERS

If the product contains a laser avoid direct exposure to the beam when the cover is open or when interlocks are defeated or have failed.

FRANÇAIS
CONSIGNES DE SECURITE

AVERTISSEMENT: vous devez respecter les précautions suivantes

POUR TOUS LES PRODUITS

Avant d'effectuer une intervention d'entretien sur le châssis, vous devez insérer un transformateur d'isolement entre la ligne d'alimentation électrique et le produit.

1. Lors de la remontage du châssis dans le coffret, vérifiez que tous les dispositifs de protection sont remis en place.
2. Lorsqu'une intervention d'entretien s'avère nécessaire, respectez l'agencement d'origine des conducteurs. Vous devez prendre des précautions supplémentaires pour garantir un agencement correct des conducteurs dans toutes les zones où des circuits haute tension sont présents.
3. De nombreux composants électriques et mécaniques des appareils HITACHI ont des caractéristiques spéciales de sécurité. Bien souvent, ces caractéristiques ne sont pas évidentes lors d'un examen visuel et la protection qu'ils offrent n'est pas forcément garantie si vous utilisez des composants de rechange conçus, par exemple, pour une tension plus élevée, une puissance plus forte. Les pièces de rechange qui offrent des caractéristiques spéciales de sécurité sont identifiées par un repérage comportant le symbole ⚠ sur les schémas et sur la nomenclature des pièces de rechange. L'emploi d'un composant de rechange qui ne respecte pas les mêmes caractéristiques de sécurité que la pièce de rechange que recommande HITACHI et qui figure dans la nomenclature risque de provoquer un choc électrique, un incendie, des rayons X ou d'autres dangers.
4. Remettez toujours en place les entretoises d'origine et respectez la longueur des conduites. En outre, à la suite d'un court-circuit, remplacez les composants présentant des signes de surchauffe.
5. La résistance d'isolement doit être supérieure ou égale à 2 méga ohms à 500 V c.c. entre les pôles principaux et des composants métalliques accessibles, quels qu'ils soient.
6. Aucun claquage et aucune rupture ne doit se produire pendant l'essai de résistance diélectrique à la suite de l'application d'une tension de 3 kV c.a. ou de 4,35 kV c.c. pendant deux secondes entre les pôles principaux et des composants métalliques accessibles.
7. Avant de remettre au client un produit qui a fait l'objet d'un entretien, le technicien qui s'est chargé de cette intervention doit tester à fond cet ensemble pour s'assurer qu'il ne présente aucun danger opérationnel et aucun risque de choc électrique. Ce technicien doit s'assurer qu'aucun des dispositifs de protection intégrés à cet instrument par le fabricant n'est défectueux ou n'a été endommagé de façon accidentelle lors de l'entretien.

LABEL CE

1. Les produits HITACHI peuvent avoir reçu le label CE qui figure sur la plaque signalétique pour indiquer que cet ensemble contient des composants qui ont fait l'objet d'une homologation spécifique de respect des normes de compatibilité électromagnétique en fonction de niveaux bien spécifiés.
2. Lors du remplacement d'un des composants de ce produit, utilisez uniquement le composant correct identifié dans la nomenclature afin de maintenir le respect de cette norme ; en outre, vous devez également ramener l'agencement des conducteurs à son état d'origine car cela peut avoir une influence au niveau des rayonnements électromagnétiques et sur la protection contre ces rayons.

PICTURE TUBE

1. L'étage de sortie des lignes peut développer des tensions de plus de 25 kV ; s'il faut retirer le chapeau de protection contre les tensions extrêmement élevées, il convient de décharger l'anode contre le châssis par le biais d'une résistance de forte valeur avant de déposer ce chapeau du tube image.
2. La haute tension doit toujours se maintenir à la valeur nominale du châssis et ne pas dépasser cette dernière. Un fonctionnement à des températures élevées peut provoquer une défaillance du tube image ou l'entrée d'une tension élevée. Dans certains cas, cela peut même provoquer des rayons X d'un niveau légèrement supérieur aux valeurs de calcul. Cette haute tension ne doit en aucun cas dépasser 29 kV sur le châssis (à l'exception des téléviseurs de projection).
3. La principale source de rayons X de cet appareil est le tube image. Le tube image employé pour assurer la fonction susmentionnée dans ce châssis est spécialement construit pour limiter des rayons X. Pour maintenir cette protection contre les rayons X, il faut remplacer le tube d'origine d'un type agréé par HITACHI par un autre tube de même type.
4. Lors des manipulations, ne tenez jamais le tube image contre le corps. Pendant toutes les opérations d'installation, de dépose et de manipulation de ce tube image, quelle que soit la méthode employée, vous devez toujours porter des lunettes de sécurité anti-éclatements. Les personnes qui ne portent pas ce type de lunettes doivent se tenir à l'écart du tube image lors de la manipulation de ce dernier.

RAYONS LASER

Si ce produit contient un rayon laser, évitez toute exposition directe à ce faisceau lors de l'ouverture du couvercle ou lors de l'élimination des verrouillages de sécurité ou après défaillance de ces verrouillages.

DEUTSCH

SICHERHEITSVORKEHRUNGEN

WARNUNG: Die folgenden Vorkehrungen müssen eingehalten werden.

ALLE PRODUKTE

Bevor die Grundplatte gewartet wird, sollte ein Trenntrafo zwischen die Netzleitung und das Produkt eingebracht werden.

1. Wenn die Grundplatte in das Gehäuse zurückgestellt wird, stellen Sie sicher, dass alle Schutzvorrichtungen wieder an ihrem Ort sind.
2. Wenn Wartung erforderlich ist, halten Sie die originale Verdrahtungsart ein. Besondere Vorsicht ist nötig, um die korrekte Verdrahtungsart in jedem Hochspannungsstromkreis zu gewährleisten.
3. Viele elektrische und mechanische Teile von HITACHI Produkten haben besondere sicherheitsbezogene Eigenschaften. Diese Eigenschaften fallen oft nicht ins Auge, aber der durch sie gewährte Schutz kann nicht unbedingt erreicht werden, wenn man Ersatzteile benutzt, die für höhere Spannung, Leistung usw. ausgelegt sind. Ersatzteile, die diese besonderen Sicherheitsmerkmale haben, sind in den Prinzipskizzen und Ersatzteillisten an einem ⚠ zu erkennen.
   Der Gebrauch von Ersatzteilen, die nicht dieselben Sicherheitsmerkmale haben wie die empfohlenen HITACHI Ersatzteile, wie sie in der Ersatzteilliste aufgeführt sind, kann zu elektrischem Schlag, Feuer, Röntgenstrahlung und anderen Gefahren führen.
4. Immer die originalen Abstandsstücke ersetzen und die Leitungslängen beibehalten. Wo ein Kurzschluss passiert ist, die Teile ersetzen, bei denen Überhitzung nachzuweisen ist.
5. Der Isolierwert sollte bei 500 V Gleichstrom zwischen den Hauptpolen und allen zugänglichen Metallteilen nicht unter 2M Ohm liegen.
6. Bei der Prüfung auf Durchschlagsfestigkeit sollte kein Überschlag oder Durchschlag vorkommen, wenn zwei Sekunden lang 3 kV Wechselstrom oder 4,25 kV Gleichstrom zwischen den Hauptpolen und allen zugänglichen Metallteilen angelegt wird.
7. Bevor das gewartete Produkt dem Kunden zurückgegeben wird, muss der Wartungstechniker das Gerät gründlich prüfen, um sicherzustellen, dass es betriebssicher ist ohne das Risiko eines elektrischen Schlages. Der Wartungstechniker muss sicherstellen, dass keine vom Hersteller im Gerät eingebaute Schutzvorkehrung schadhaft geworden ist oder bei der Wartung unabsichtlich beschädigt wurde.

CE KENNZEICHEN

1. HITACHI Produkte enthalten eventuell das CE Kennzeichen auf dem Leistungsschild, welches angibt, dass das Produkt Teile enthält, die eigens zugelassen sind, um bis zu einem spezifizierten Niveau elektromagnetische Störfreiheit zu bewirken.
2. Wenn Sie irgendein Teil in diesem Produkt ersetzen, benutzen Sie bitte nur das korrekte Teil, das in der Ersatzteilliste aufgeführt ist, um sicherzustellen, dass dieser Standard eingehalten wird, und geben Sie acht, die Verdrahtungsart in ihren ursprünglichen Zustand zurück zu versetzen, weil das einen Einfluss auf die elektromagnetische Abstrahlung/Störsicherheit haben kann.

BILDRÖHRE

1. Die Leitungsausgangsstufe kann Spannungen von mehr als 25 kV entwickeln; wenn die Höchstspannungskappe entfernt werden muss, entladen Sie die Anode zum Gehäuse über einen hochohmigen Widerstand, bevor Sie sie aus der Bildröhre entfernen.
2. Hochspannung sollte immer auf den festgelegten Wert des Gehäuses beschränkt bleiben und nicht mehr. Betrieb bei höherer Spannung kann zum Versagen der Bildröhre oder zu hoher Spannungszufuhr führen und kann unter Umständen auch Röntgenstrahlung hervorbringen, die leicht über dem Konstruktionsniveau liegt. Die Hochspannung darf auf keinen Fall 29 kV am Gehäuse überschreiten (außer bei Projektionsfernsehern).
3. Die Hauptquelle der Röntgenstrahlung im Produkt ist die Bildröhre. Die Bildröhre, die für die oben erwähnte Funktion in diesem Gehäuse benutzt wird, ist eine Spezialkonstruktion zur Begrenzung der Röntgenstrahlung. Um den Schutz vor der Röntgenstrahlung zu behalten, ersetzen Sie bitte die Röhre durch denselben Typ wie den ursprünglichen von HITACHI zugelassenen.
8. Halten Sie die Bildröhre bei der Handhabung vom Körper weg. Sie dürfen die Bildröhre nur dann installieren, entfernen oder handhaben, wenn Sie eine nicht splitternde Schutzbrille tragen. Personen ohne derartigen Schutz sollten ferngehalten werden, solange Bildröhren gehandhabt werden.

LASER

Wenn das Produkt einen Laser enthält, setzen Sie sich keinesfalls direkt dem Strahl aus, wenn die Abdeckung geöffnet ist oder wenn die Verriegelung versagt.

1. DISPLAY ALIGNMENT 5

A. DISPLAY SIZE 5
B. PICTURE POSITION 5
C. LINEARITY 5
D. GEOMETRY DISTORTION (ALL PRESET MODES) 5
E. ALIGNMENT PROCEDURE 5
F. WHITE BALANCE ADJUSTMENT (9300° AS MAJOR TEMPERATURE) LOW LIGHT ADJUST 6
G. FOCUS ADJUSTMENT 6
H. CONVERGENCE ADJUSTMENT 6
I. PRESETTING MODES ADJUSTMENT 6
J. POWER ADJUSTMENT 7

2. CONTROLS AND CONNECTORS LAYOUT 10

A. MAIN PCB 10
B. CRT/B 11
C. PIN ASSIGNMENT 11

3. CIRCUIT DESCRIPTION 12

A. POWER SUPPLY 12
B. POWER SUPPLY BLOCK DIAGRAM 12
C. POWER SUPPLY CIRCUIT 13
D. TDA4855/4858 AUTOSYSNC DEFLECTION CONTROLLER 14
FIGURE (4) (5) 14
E. HORIZONTAL PROCESSOR 16
F. VERTICAL PRE-AMP 16
G. HORIZONTAL DRIVE 17

4. TROUBLESHOOTING 18

A. MONITOR CHECK FLOW CHART 19

APPENDIX A: SCHEMATIC DIAGRAMS & PCB ASSEMBLIES 22

APPENDIX B: PARTS LIST 30

APPENDIX C: DISPLAY UNIT ASSEMBLY 50

APPENDIX D: CRT & YOKE ASSEMBLY 53

1. DISPLAY ALIGNMENT

A. Display Size

All preset mode listings in Table 1. shall be within the following limitations:

H. WIDTH: 350 ± 4 mm

V. HEIGHT: 260 ± 4 mm

B. Picture Position

All preset mode listings in Table 1 shall be within the following limitations:

H. PHASESCREEN : SCREEN CENTRE ± 4 mm

V. CENTERSCREEN : SCREEN CENTRE ± 3 mm

C. Linearity

The CONTRAST and BRIGHTNESS control shall be properly adjusted at 15 F-L with Full-intensity reverse pattern, then change to crosshatch Pattern. The measured values of linearity should be less than 10% when calculated using all latticrs and should be less than 6% when calculated using adjacent lattices.
The calculation formula was listed below:

$$\frac{H\max - H\min}{(H\max + H\min)/2} \times 100\% \text{ or } \frac{V\max - V\min}{(V\max + V\min)/2} \times 100\%$$

D. Geometry Distortion (all preset modes)

The CONTRAST and BRIGHTNESS control shall be properly adjusted at 15 F-L with full-intensity reverse pattern, then switch to cross hatch pattern and place unit facing east.
Pincushion should be less than 2.0mm
Barrel should be less than 2.0mm (top & bottom)/ 1.5 (left side & right side)
Trapezoid should be less than 3.5mm Parallelogram should be less than 3.5mmTilt should be less than 1/2 degree.

E. Alignment Procedure

E-1. Brightness Adjust:

1. Adjust the VR980 so that the +15VS rail is 14.9V±0.1V (The voltage of the C944) in TIMING 1.
2. Check the voltages below :.

C974 :	202 ± 3V
C947 :	76 ± 2V
C946 :	44 ± 1.5V
C940 :	10.4 ± 0.4V
C959 :	12 ± 0.3V

3. Short-Circuit protection function check.
   - The power source is 230VAC input.
   - When C944 is shorted, all output voltage should be shut down and unlatch.
   - When normal condition is recovered, all output voltage should recover automatically.

E-2. Light output adjust

- Select Timing 1, preset BRI. And CONT. to max. position.
- Adjust G2 to get G2 = 550V ± 10V
- Adjust VR803 to get light output = 0.3FL ~ 0.6FL
- Select Timing 2, adjust VR405 to get pattern over scan. (H SIZE 100%)

F. White Balance Adjustment (9300°as major temperature) Low light adjust

9300°	6500°	5000°
x = 0.283 ± 10	x = 0.313 ± 15	x = 0.324 ± 15
y = 0.297 ± 10	y = 0.329 ± 15	y = 0.342 ± 15
Y = 0.3 ~ 0.6FL	Y = 0.3 ~ 0.6FL	Y = 0.3 ~ 0.6FL

1. Select Timing 6, adjust BRI. And CONT. to max. disconnect RGB signals, adjust R/B BAIS to 100 scale (OSD then slowly adjust G BAIS to 100 scale adjust VR803 to get light output = 0.3 ~ 0.6FL for 9300°, repeat above steps for 6500° and 5000° R/B GAIN setting to get raster color temperature within specified, finally, adjust BRI to get raster = 0.06FL.
2. High light adjust

9300°	6500°	5000°
x = 0.283 ± 10	x = 0.313 ± 10	x = 0.324 ± 10
y = 0.297 ± 10	y = 0.329 ± 10	y = 0.342 ± 10
Y =30 $^{-0}_{+5}$ FL	Y = 30 $^{-0}_{+5}$ FL	Y =30 $^{-0}_{+5}$ FL

Select Timing 4, measure 2 "square, set CONT. to Max, position and SUB-CONT to 127, R/B GAIN to 200, G GAIN to 200, adjust SUB-CONT to get light output = 35 $^{-0}_{+5}$ FL for 9300°, repeat above steps for 6500° and 5000° R/B GAIN setting to get color temperature within specified.

3. Select Timing 3 with full white pattern adjust OSD-ABL (SUB BRIGHTNESS) to get full white light output = 30 ± 2 FL.

G. Focus Adjustment

G-1. Adjust brightness, have the brightness of raster be 0.06FL and contraset be 30FL in timming 6.

G-2. Adjust the G4a and G4b of theFBT, have focus be in the best condition on the 1/4 diagonal of screen in timing 5.

H. Convergence Adjustment

Input R+B and R+G signals, make sure convergence within specified (if not 4 pole and 6 pole). A zone = 0.3MM., B zone 0.4MM. (X) < 0.4MM, (Y) < 0.4MM.

NOTE : 1. A area = 260mm (circle)

2. B area = 350 x 260 mm

I. Presetting Modes Adjustment

There are 12 preset modes, individual adjust is needed.

1. H-SIZE adjust : adjust control key to get H-SIZE = 350 ± 4mm.
2. H-CENTRE adjust : adjust control key to get centre within ± 4mm
3. V-SIZE adjust : adjust control key to get V-SIZE = 260 ± 3mm
4. V-CENTRE adjust : adjust control key to get centre within ±2mm
5. Geometric adjust : adjust control key to get minimum distortion.
6. H-linearity check : check and make sure linearity meets spec..

$$\frac{2(\text{MAX} - \text{MIN})}{\text{MAX} + \text{MIN}} \times 100\%$$

(CROSS HATCH PATTERN 10X8)

Any : <10%
Adjacent : <5%

7. V-linearity check : check and make sure linearity meets spec.

$$\frac{2\,(MAX - MIN)}{MAX + MIN} \times 100\%$$

Any : <10%
Adjacent : <6%

8. Geometric check : check and make sure geometric meets spec.
9. Get into OSD select EE-USER item, press ENTER till OSD disappear then turn off power, disconnect JP1, turn on power again, make sure all of the alignment parameters has been stored properly, make H-SIZE adjust range can OVER SCAN and -5%, PHASE adjust range >15mm, V-SIZE adjust range can OVER SCAN and -6%, V-CENTRE adjust range >20mm and make sure TILT adjust works properly.

J. Power Adjustment

J-1. Adjust the VR980 so that the +15Vs rail is 15.3v±0.1v (voltage of the C944) in timing 1.

J-2. Check voltages below:

C974 :	202±3v
C947 :	76 ± 2v
C946 :	44 ± 1.5v
C940 :	10.4 ± 1v

J-3. Short-circuit protection function check

1. the power source is 230vac input
2. when C944 is shorted, all output voltage should be shut down and unlatch
3. when normal condition is recovered, all output voltage should recover automatically.

J-4. Side Pincushion, Tilt and Geometry Distortion Adjustment

1. Input timing 1, adjust the display be normal position and size.
2. Adjust front control key to get the best pincushion distortion and tilt.
3. Select P502 and adjust VR402~VR404 to get the best geometry distortion.

J-5. Focus Adjustment

1. Input timing 1, EXT. BRIGHTNESS move to center position. Use EXT.CONTRAST set the brightness to 25FL.
2. Adjust Focus VR (mounting on FBT), to get best focus.

J-6. Preset Timing Adjustment

1. Input each PRESET MODE timing, and use front control key, adjust the display to the normal position and size and wait for 5 seconds.
2. Switch to next timing repeat 1 process. Until every PRESET MODE timing has been adjusted.

J-7. Timing And Pattern

Timing mode	pattern.mdnm/
1 VESA 80k	CROSS HATCH
2 VESA 80K	2" SQUARE
3 VESA 80K	FULL WHITE

J-8. Power Saving Function Check

The power source is 230Vac input
When the sync signal is removed, the monitor should enter suspend-mode and then off-mode.
When power saving, the power consumption of monitor should be less than: suspend mode 8w off-mode
The monitor recovering time from suspend-mode or off-mode to on-mode should be less than 5 seconds.

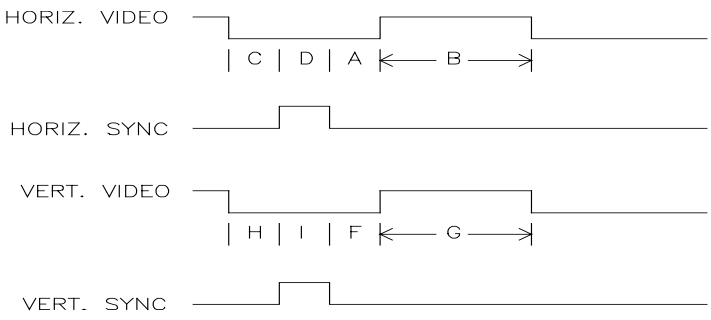
TABLE 1

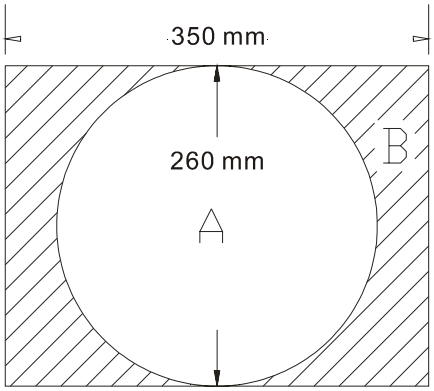
TIMMING	MODE	PATTERN
1.	64K	***51 CROSSHATCH***
2.	37.8K/60HZ	***51 CROSSHATCH***
3.	60K	Full-white
4.	60K	5×2″squares
5.	80K	"me"
6.	80K	5×2″squares

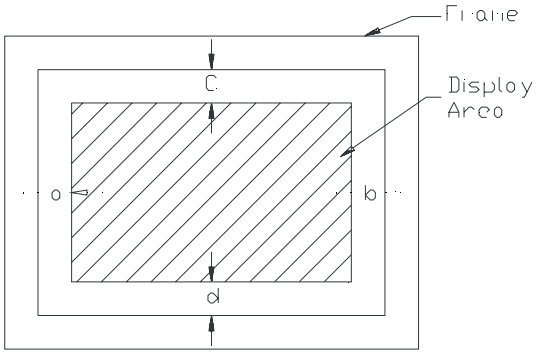
PRESET MODES TABLE 2

	MODE	H Pixes V Lines	Fd (MHz) Polar (H/V)	Fh (KHz) Fv (Hz)	F: Th (us) F: Tv (ms)	D: Td (us) D: Td (ms)	C: Tb (us) C: Tb (ms)	B: Tp (us) B: Tp (ms)	A: Tf (us) A: Tf (ms)
			d: dot			d: display	b: back porch	p: pulse	f: front
1	VGA60	640 480	25.175 N/N	31.469 59.941	31.778 16.683	25.422 15.253	1.907 1.048	3.813 0.064	0.636 0.318
2	VESA75	640 480	31.5 N/N	37.5 75	26.67 13.33	20.317 12.8	3.81 0.427	2.032 0.08	0.508 0.026
3	VGA70	720 400	28.322 N/P	31.47 70.09	31.78 14.27	25.422 12.711	1.907 1.112	3.813 0.064	0.636 0.381
4	VESA60	800 600	40 P/P	37.88 60.32	26.4 16.58	20 15.84	2.2 0.607	3.2 0.106	1 0.025
5	VESA85	800 600	56.25 P/P	53.674 85.061	18.631 11.756	14.222 11.179	2.702 0.503	1.138 0.056	0.569 0.019
6	VESA60	1024 768	65 N/N	48.36 60	20.68 16.67	15.754 15.88	2.462 0.6	2.092 0.124	0.369 0.063
7	VESA75	1024 768	78.75 P/P	60.023 75.029	16.66 13.328	13.003 12.795	2.235 0.466	1.219 0.05	0.203 0.017
8	VESA85	1024 768	94.5 P/P	68.677 84.997	14.561 11.765	10.836 11.183	2.201 0.524	1.016 0.044	0.508 0.014
9	VESA60	1280 1024	108 P/P	63.981 60.02	15.63 16.661	11.852 16.005	2.296 0.594	1.037 0.047	0.444 0.016
10	VESA75	1280 1024	135 P/P	79.976 75.025	12.504 13.329	9.481 12.804	1.837 0.475	1.067 0.038	0.119 0.013
11	VESA85 (primary)	1280 1024	157.5 P/P	91.146 85.024	10.971 11.761	8.127 11.235	1.422 0.483	1.016 0.033	0.406 0.011
12	VESA75	1600 1200	202.5 P/P	93.75 75	10.667 13.333	7.901 12.80	1.501 0.491	0.948 0.032	0.316 0.011

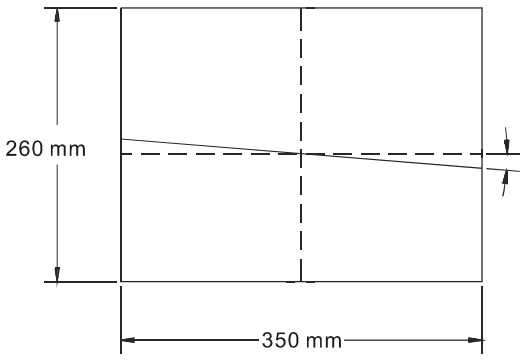
A: Back Porch (us) B: Display Time (us)
C: Front Porch (us) D: Sync Width (us)
F: Back Porch (ms) G: Display Time (ms)
H: Front Porch (ms) I: Sync Width (ms)


HORIZ. VIDEO
C
D
A
B
HORIZ. SYNC
VERT. VIDEO
H
I
F
G
VERT. SYNC


350 mm
260 mm
B
A

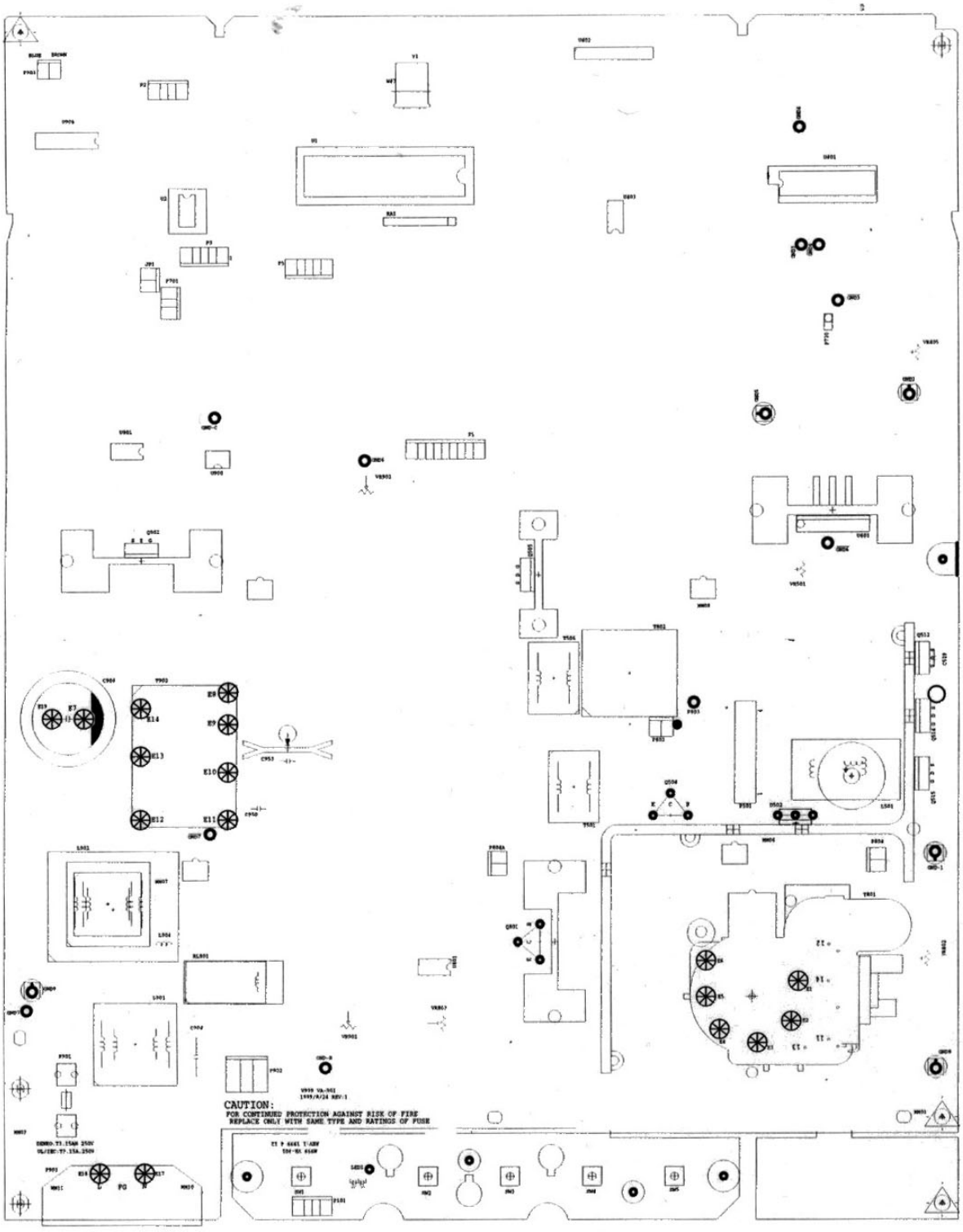

Frame
C
Display
Area
a
b
d

|a-b| <4 mm |c-d| <3 mm

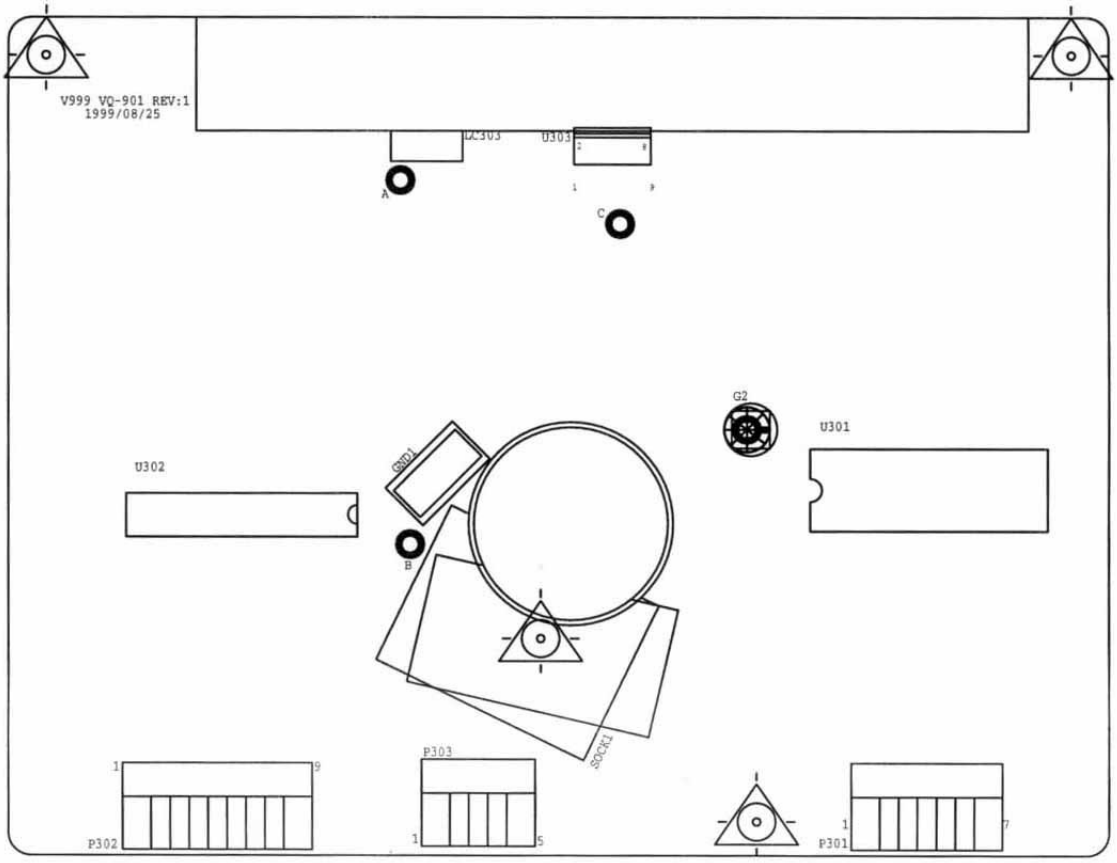

260 mm
350 mm

2. CONTROLS AND CONNECTORS LAYOUT

A. Main PCB



B. CRT/B



C. Pin Assignment

C-1. Connect Function

VR501 : H-CENTRE VR

P701 : TILT CONN

JP1: PRESET CONN

P902 : DEGAUSSING COIL CONN

P703 : X-RAY TEST PAD

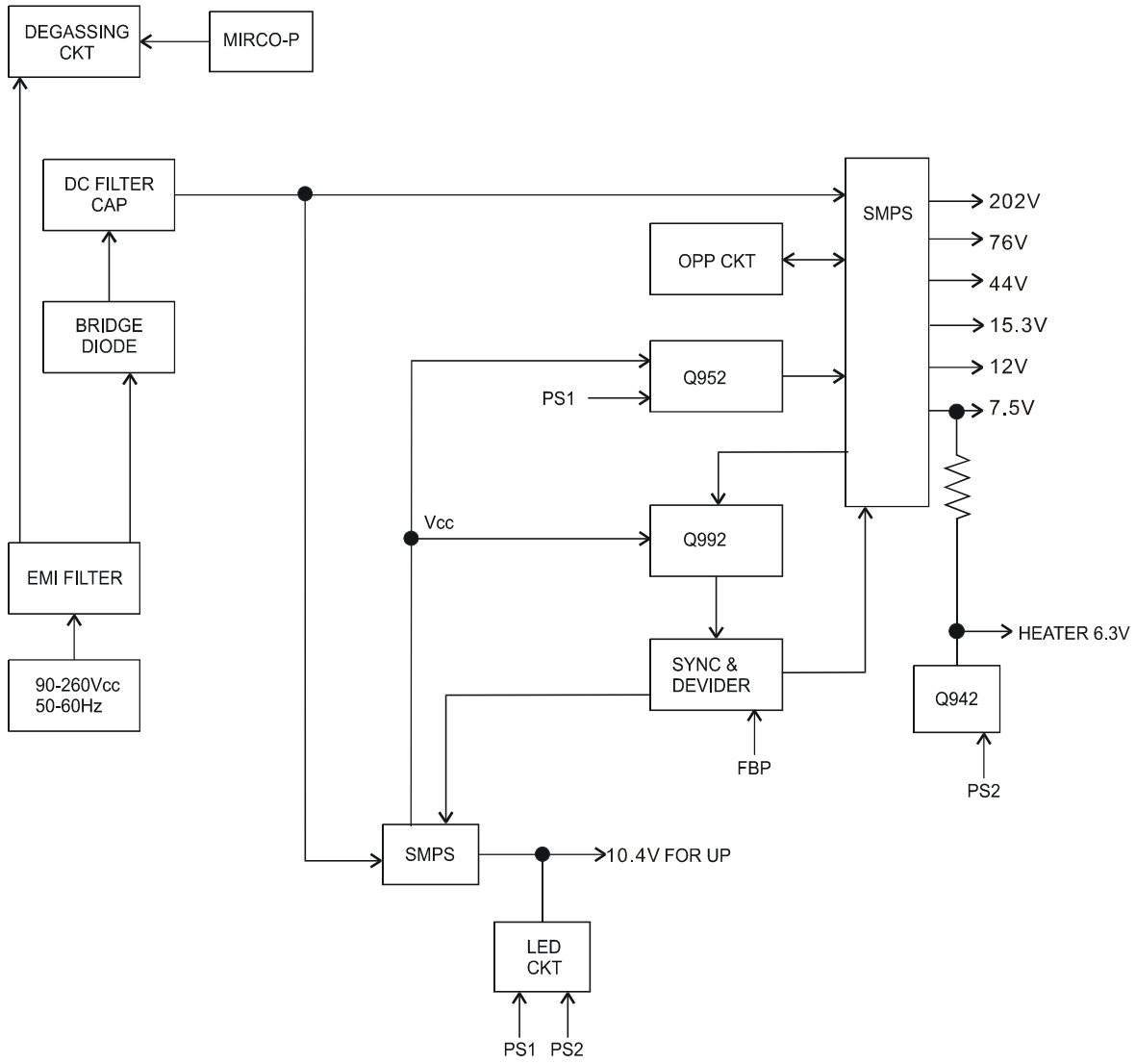
--	P302	P303	P301	P5
1	HFLB	Vout	DSUB9	DDC-SCL
2	GND	EEP-SCL	R-IN	DDC-SDA
3	G1	EEP-SCL	GND	GND
4	6.3V	H-OUT	B-IN	V-SYNC
5	5V	GND	GND	H-SYNC
6	76V	--	G-IN	--
7	12V	--	GND	--
8	CONTRAST	--	--	--

3. CIRCUIT DESCRIPTION

A. Power Supply

The F900 power supply is a universal switching mode power supply. It consists of an off-line flyback converter and a Boost converter. The output voltage and current rating are +7.5V / 0.81A, +15.3V / 0.84A, +44V /0.2A, +76V / 0.2A, and B^+ +202V / 0.4A.

B. Power Supply Block Diagram



C. Power Supply Circuit

C-1 RECTIFIER AND FILTER CIRCUIT

The 90Vac 260Vac input line voltage is rectified by DB901, and smoothed by C906 via the PFC circuit to provide DC operating voltage for the circuit.

C-2 FLYBACK AND PWM CIRCUIT

When power is initially applied to the circuit, C909 charges through R903 and Q901. When the voltage across C909 reaches a level of 16V, U901 is enabled, turning on Q903 and turning off Q901 to complete start-up action.

During the On-time of Q902, energy is stored in T902. At this time the polarity of the output windings is such that all output rectifiers are reverse biased and no energy is transferred.

Primary current is sensed by R914 and compared to a DC level that is determined by voltage feedback. When this level is reached, Q902 is turned off and the polarity of all T901A windings reverses, forward biasing the output rectifiers. All the energy stored is now transferred to the output capacitors. Many cycles of this store/release action are needed to charge the outputs to their respective voltages.

The main voltage (202V) across R944, R945, R947, C956, R946, VR901 is smoothed by C945 and fed via the optp-coupler U900 to the primary regulator to the error amplifier (U901 pin1).

C-3 SNUBBER CIRCUIT

Energy stored in the leakage inductance of T902 cause a voltage spike which be added to the normal reset voltage across T902 when Q902 turn off. The clamp consisting of D905, R904 and C907 limits this voltage excursion from exceeding the Vds rating of Q902. In addition, a turn off snubber made up of D906, R905 and C908 keeps power dissipation in Q902 low by delaying the voltage rise until drain current has decreased from its peak value. This snubber also damps out any ringing which may occur due to parasitic.

C-3 SYNCHRONIZED CIRCUIT

The oscillator frequency is defined by R912, C920. The equation is approximately:

Fosc=1.8/(R912*C920). The external signal that comes from horizontal circuit synchronises the working frequency of power circuit Via U980 to U906 (PIN 2). For divide frequency in over 50KHz by U906 (74LS221)

C-4 POWER SAVING CIRCUIT

The monitor has ON, Suspend/Standby and OFF states. The monitor enters Suspend/Standby mode if either V-sync or H-sync signals are removed. When the machine in the Suspend/Standby state, PS1 should be low to turn off +15Vs. In this state, input power should be less than 15W and LED illuminate yellow. The monitor enters OFF mode if both H-sync and V-sync are removed. When in the OFF State, PS1 and PS2 should below simultaneously to turn off +15Vs and +7.8Vs outputs. In this state, input power should by less than 5W and LED illuminate amber.

C-5 DEGAUSS CIRCUIT

The DEGU signal which comes from micro-p to control degauss coil act or not.

When DEGU is high, Q946 will be saturated to make RL901 working, AC line provides a degaussing current to degauss coil.

C-6 OVERLOAD ROTECTION CIRCUIT

The primary current flows through the current sensing resistor R914. The voltage drop on R914 will be rectified by D921 and keep a dc level in C921 that is dependent on the output power. When this DC level reach the trigger voltage of Q912, the pin1 of U901 goes low and the power stage is immediately switched off.

C-7 BROWN-OUT CIRCUIT

When the input voltage down below the setting level (85Vac-70Vac), Q914 will be supplied with a trigger voltage, pin 1 of U901 goes low and the power stage will be shut down.

C-8 PFC CIRCUIT

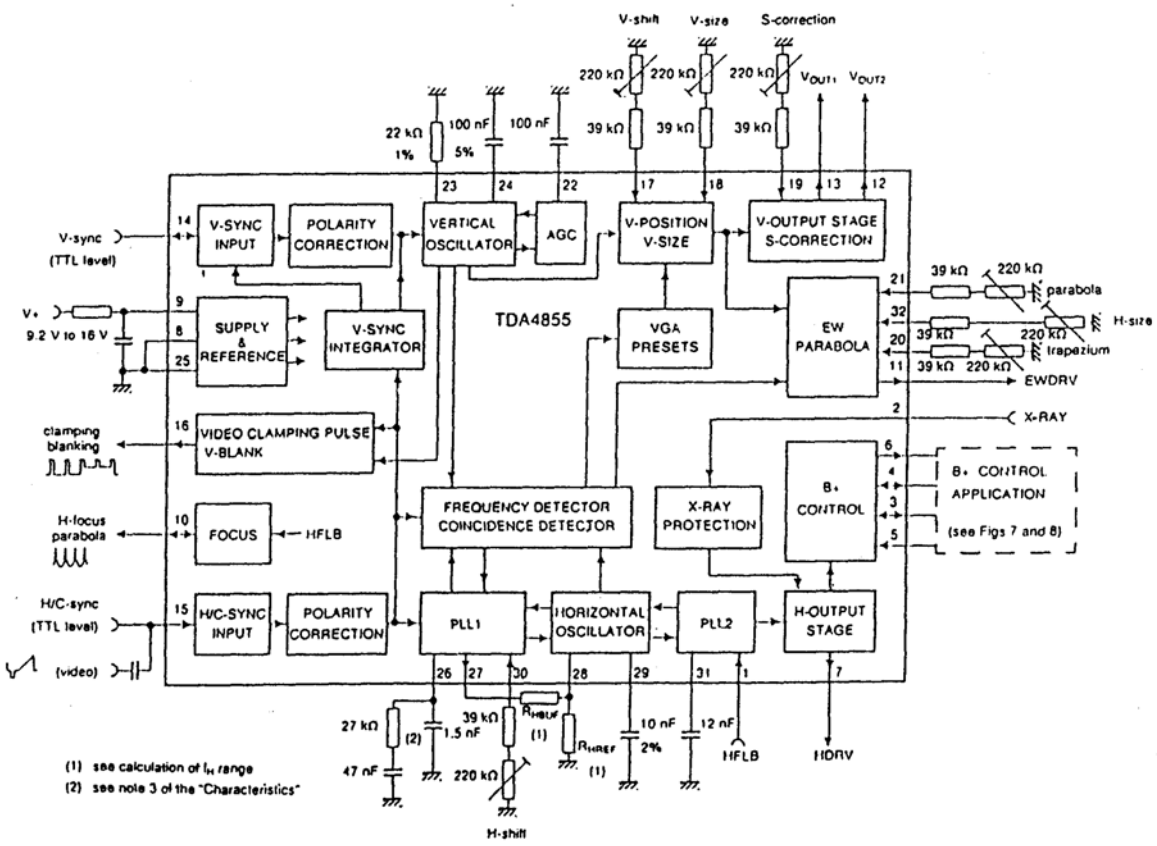
The PFC CKT is combined with U991A, D901A, T901A..., it is an active type, called" Booster Follower" circuit.

The feedback points of U991A is not only connected to C906, but also the AC line-in voltage of C901A which the voltage waveform shape is same as the line-in voltage.

The follower booster circuit can smooth the input current to improve PF value.

D. TDA4855/4858 AUTOSYSNC DEFLECTION CONTROLLER

Figure (4) (5)



Pinning

SYMBOL	PIN	DESCRIPTION
HFLB	1	horizontal flyback input
XRAY	2	X-ray protection input
BOP	3	B+ control OTA output
BSENS	4	B+ control comparator input
BIN	5	B+ control OTA input
BDRV	6	B+ control driver output
HDRV	7	horizontal driver output
GNDP	8	ground (power ground)
Vcc	9	positive supply voltage
FOCUS	10	H- focus parabola output
EWDRV	11	EW parabola output
VOUT2	12	vertical output 2 (ascending sawtooth)
VOUT1	13	vertical output 2 (ascending sawtooth)
VSYNC	14	vertical sync input /output
HSYNC	15	horizontal / composite sync input
CLBL	16	video clamping pulse / V-blanking output
VPOS	17	V- shift input
VAMP	18	V- size input
VSCOR	19	vertical S -correction input
EWTRP	20	Ew trapezium correction input
EWPAR	21	Ew parabola amplitude input
VAGC	22	external capacitor for V-amplitude control
VREF	23	external resistor for vertical oscillator
VCAP	24	external capacitor for vertical oscillator
GNDS	25	ground (signal ground)
HPLL1	26	external filter for PLL 1
HBUF	27	buffered f/v voltage output
HREF	28	reference current for horizontal oscillator
HCAP	29	external capacitor for horizontal oscillator
HPOS	30	H- shift input
HPLL2	31	external filter for PLL 2/soft start
EWWID	32	H-size input

D-1. Sync processor

Pin 15 accepts H or H+V sync.

Pin 14 in H/V separate signal is input-mode, in H/V composite signal is output-mode. This function is used as mode detector.

E. Horizontal Processor

H sync go through TDA4855 internal separation circuit to the first comparator for HOR. Phase ADJ and then to stage output. A HOR. Drive pulse from pin 7 and input H-sync limit is setting by R431, R432 and C415.

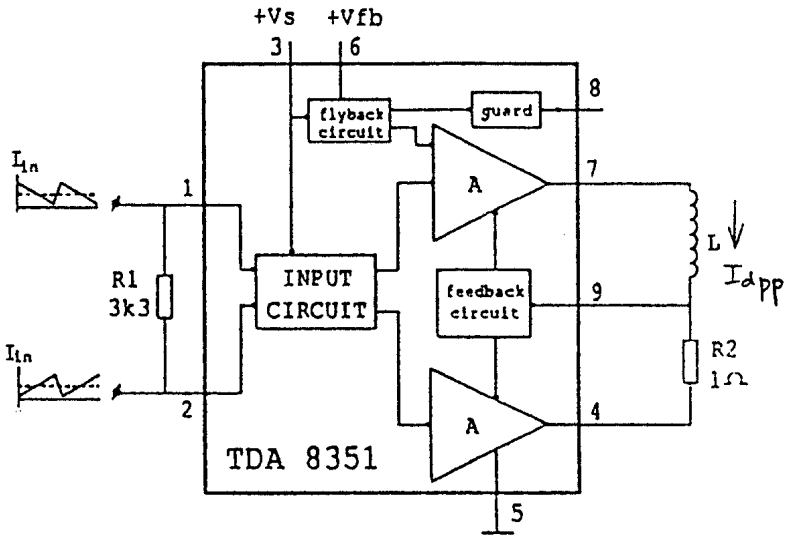
E-1. Geometric distortion correction

The E-W parabola output from pin 11 is controlled DC CONTROL (pin 20 & 21) and this parabola go through Q404-Q407 input to pin30 (HOR. Phase ADJ.) for pin-balance ADJ. and also go through Q408-Q411 for parallel ADJ. And through Q412-Q414 for corner ADJ.

F. Vertical Pre-Amp

VERT. Sync input to VERT. OSC. and generates a saw-tooth at pin 24, the free-run frequency is setting by R428 and C412 & (fvo=1/10.8 x R428 x C412 & C445), the V-position is controlled by the D-C (pin 17), and V-size is controlled by D-C (pin 18), and the pin 19 is to ADJ. VERT. linearity.

F-1. VERT output circuit U601 (TDA 8351) see Figure (6)



The saw-tooth is output from U401 pin # 12 & 13. to the pins # 1 and 2 of TDA8351 (vert output amplifier) and then output from pin # 7 to the vert DY for vert. deflection.

F-2. Horizontal size modulation

To modulation H-size control DC is achieved by applying a parabola to the pins 3 and 5 to control U402 mono-stable to generate a square wave to drive Q505 thus obtaining a variable B+ which is input frequency dependent.

31.5KHz T=31.75mS

$$\text{HOR.B+=200V} \times \frac{6.8 \text{ to } 8.6 \text{ mS}}{31.75 \text{ mS}} = 43.2 \text{ to } 54.7\text{V}$$

95KHZ T=10.526 mS

$$\text{HOR.B+=200V} \times \frac{6.8 \text{ to } 8.6 \text{ mS}}{10.526 \text{ mS}} = 130 \text{ to} 165\text{V}$$

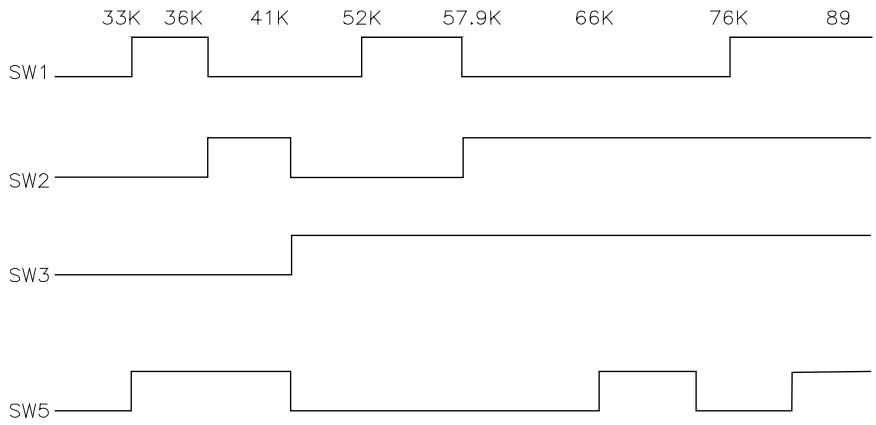
G. Horizontal Drive

The drive pulse output from pin 7 of U401 (TDA 4855) through a buffer (Q416/ Q417) and drive stage (Q503, T501), drives the HOR. Output transistor (Q504).

G-1. CS Circuit

CS control is multiple type the SW1/ SW2/ SW3/ SW5 of U1 to control Q512/ Q520/ Q514/Q515

CS transistor switch Ref. To Fig. Below-



G-2. HORIZONTAL Linear

The D-C HOR. linear control circuit outputs a duty cycle (PWM) through Q545 & Q546 to the winding of L501 to ADJ. the inductance of linear coil of L501.

G-3. HV circuit

A reference voltage is derived from the bleeder of FBT and input to U801 (PWM modulator IC) to drive Q801.
When Q801 turns on the energy is stored in the FBT. When Q801 turns off, the resonate circuit creates a pulse to the FBT to generate a HV (*25KV / 26KV) and G5 voltage (6.1~7.8KV) and G1 voltage (-180V) and +32V for X-RAY protection and +300V for dynamic focus.

H. Video Amp Circuit

H-1. Video PRE AMP

U301 (M52743) is the Video PRE-AMP. The input signal is 0.7Vp-p, the pre-amp IC U301 amplifies the video signal to be 3-4 Vp-p and controls white balance and contrast.

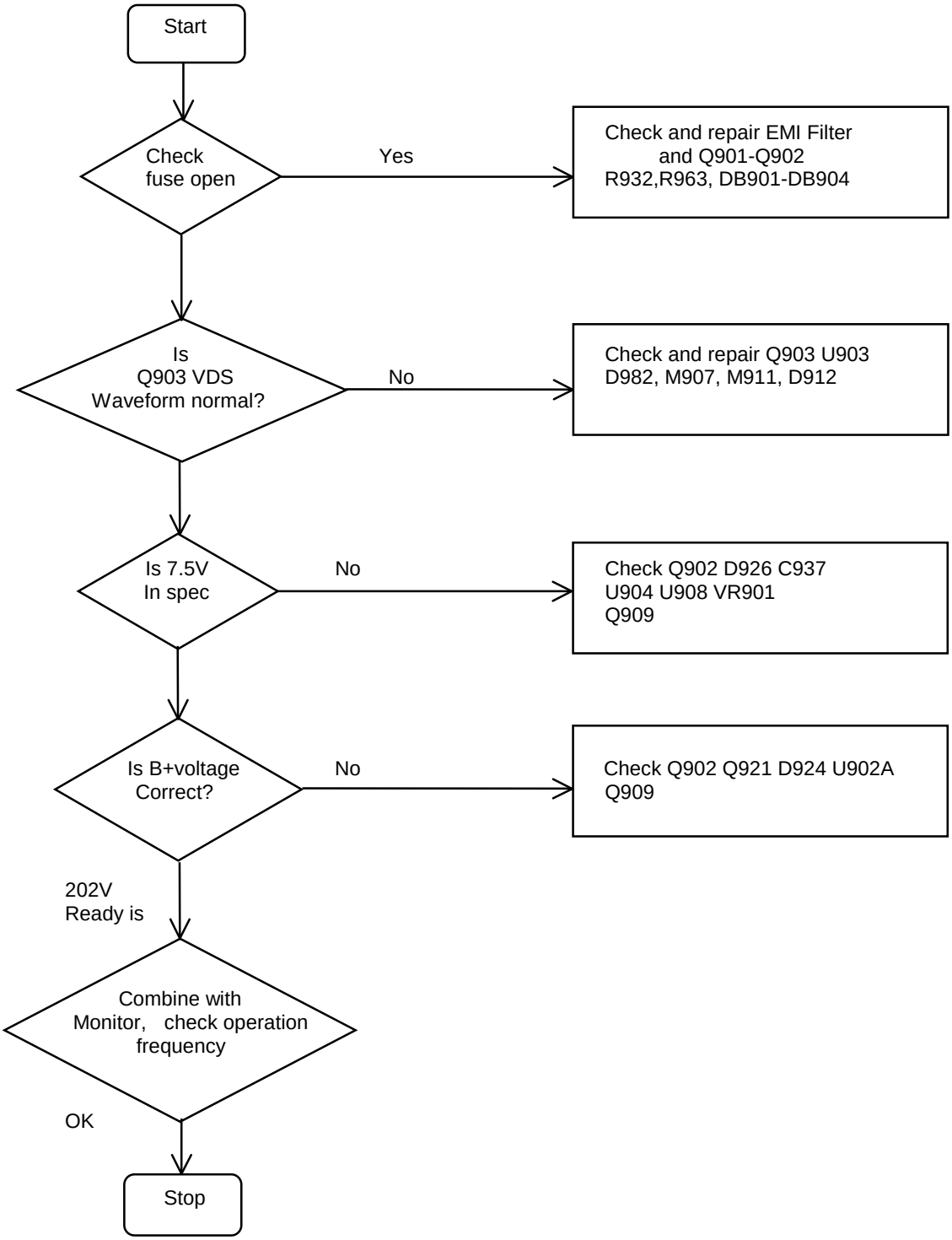
H-2. Video output AMP

This stage including AMP IC (U303) amplifies the video signal to be around 40Vp-p and drives the CRT cathode.

H-3. OSD signal

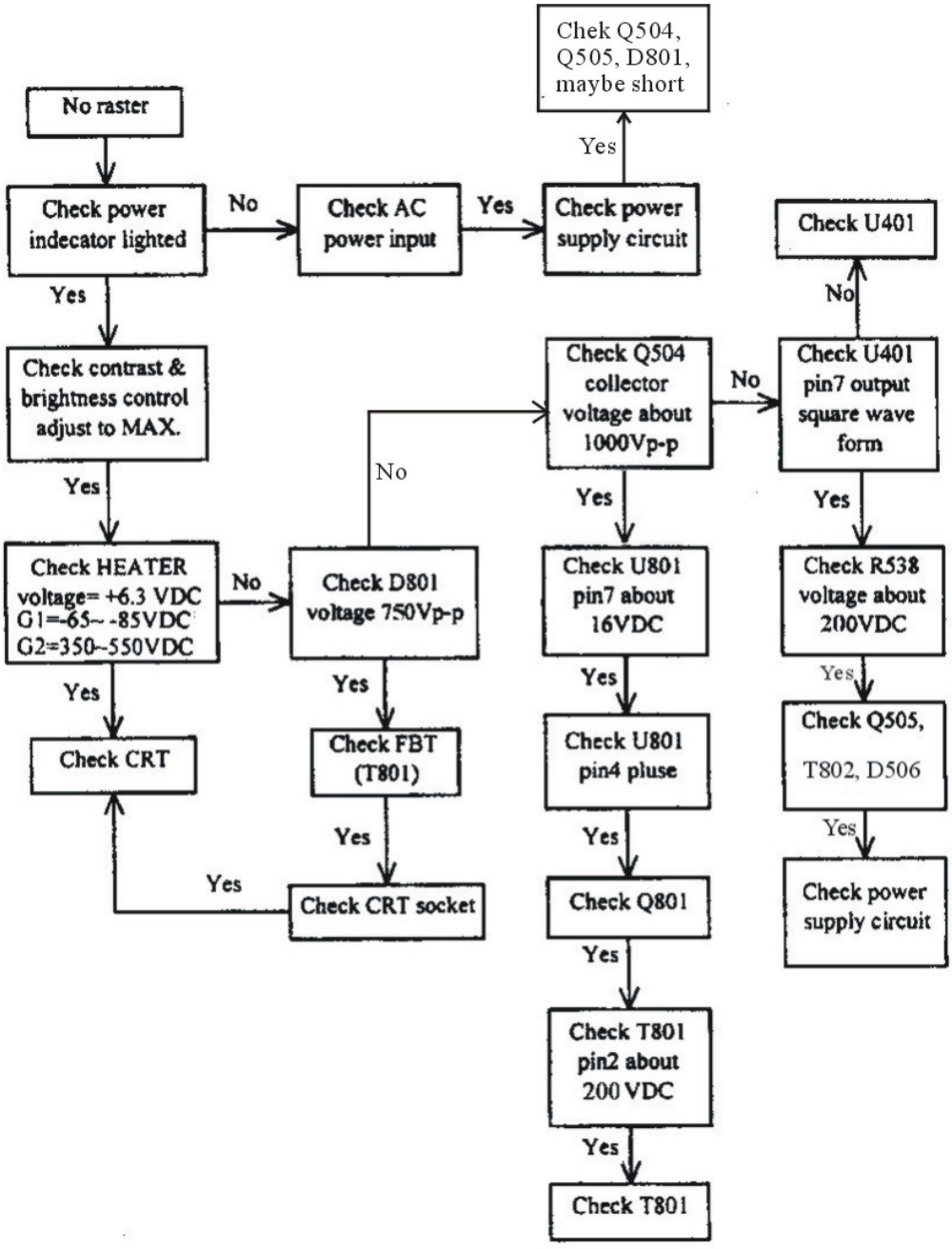
The Mirco-p output DATA and CLK, to the OSD IC U302 (CM46542) and output data on the VIDEO OUTPUT.

4. TROUBLESHOOTING

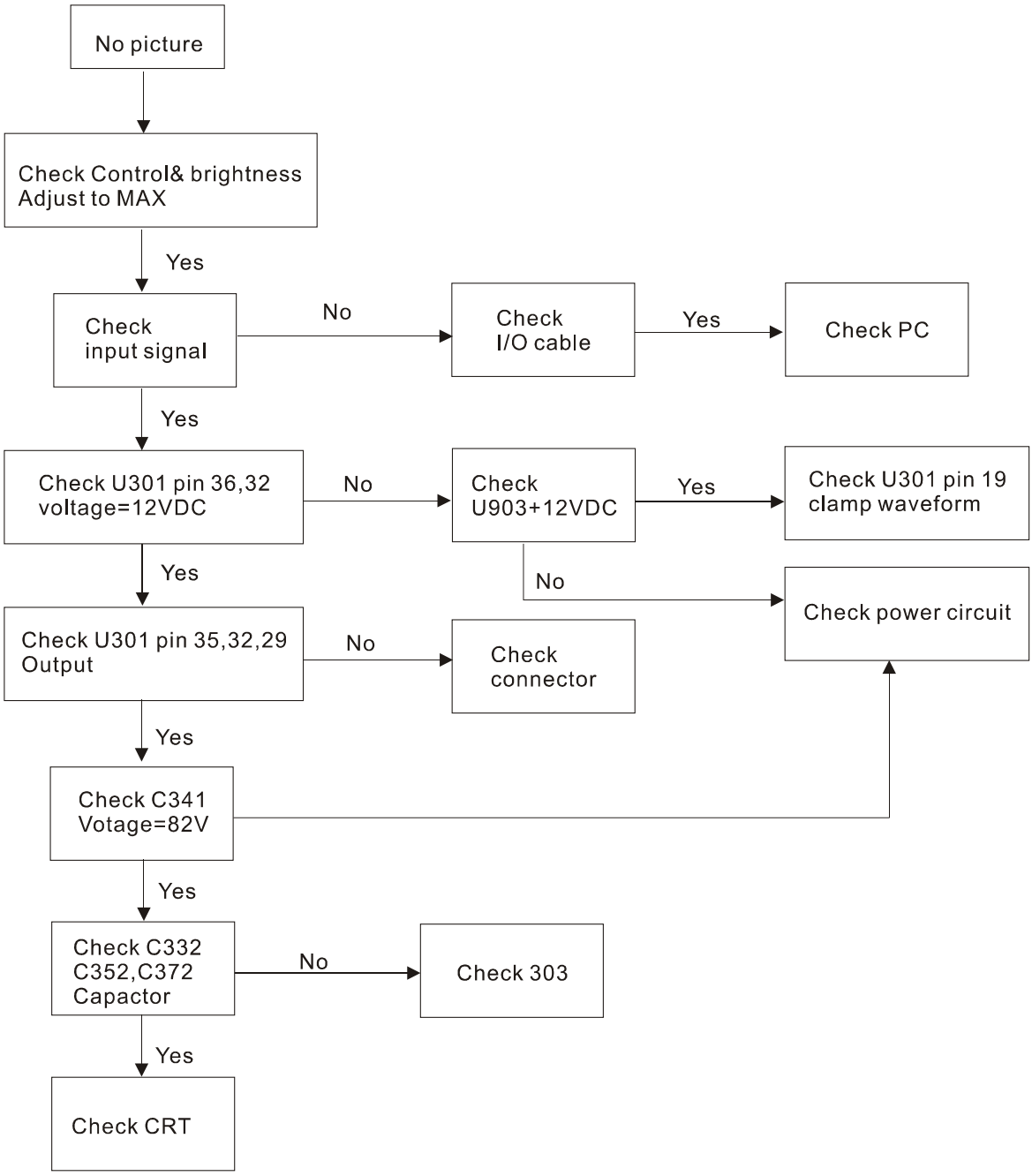


A. Monitor Check Flow Chart

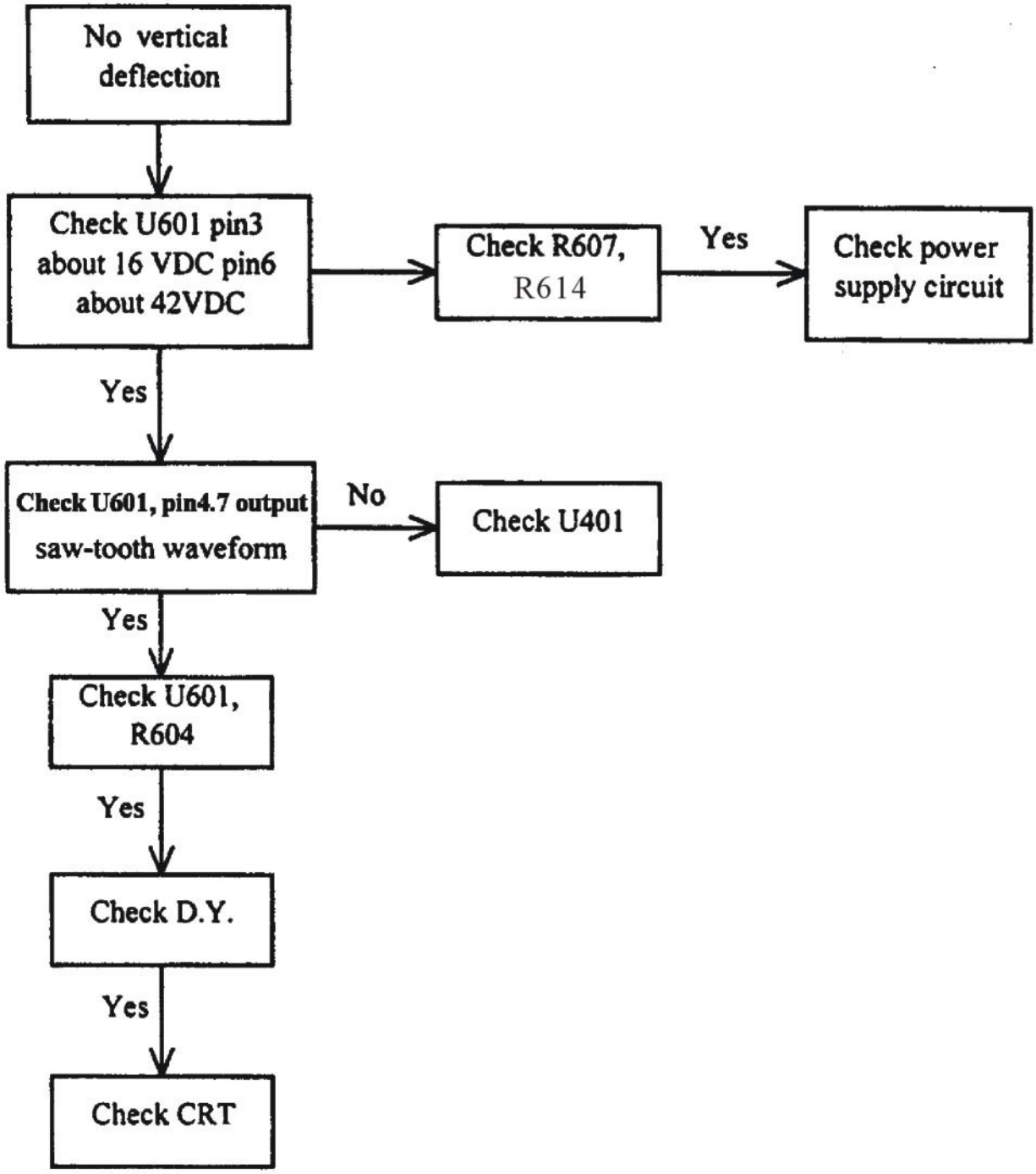
A-1. No raster



A-2. No Picture

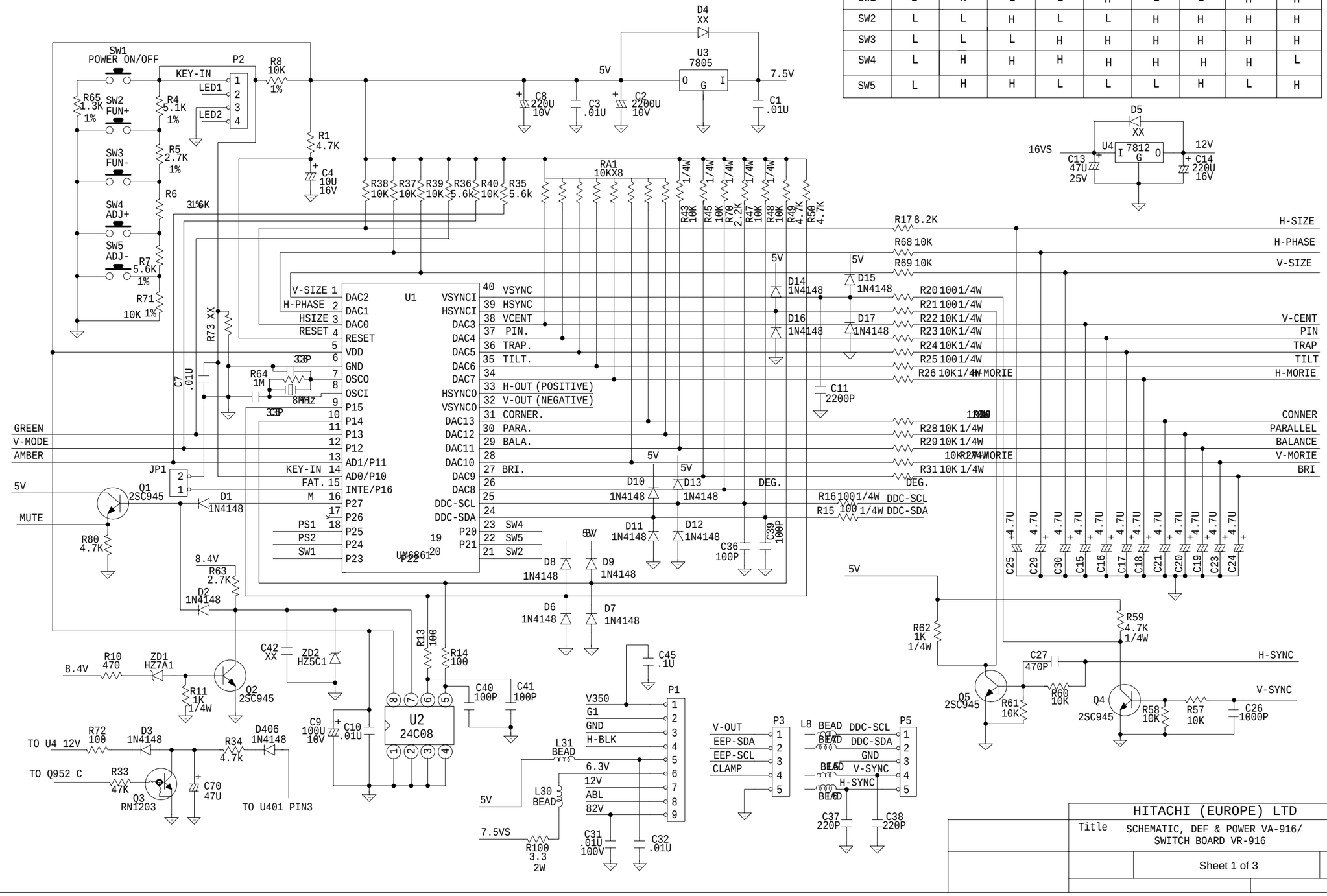


A-3. No vertical deflection (raster become a horizontal line)



APPENDIX A: SCHEMATIC DIAGRAMS & PCB ASSEMBLIES

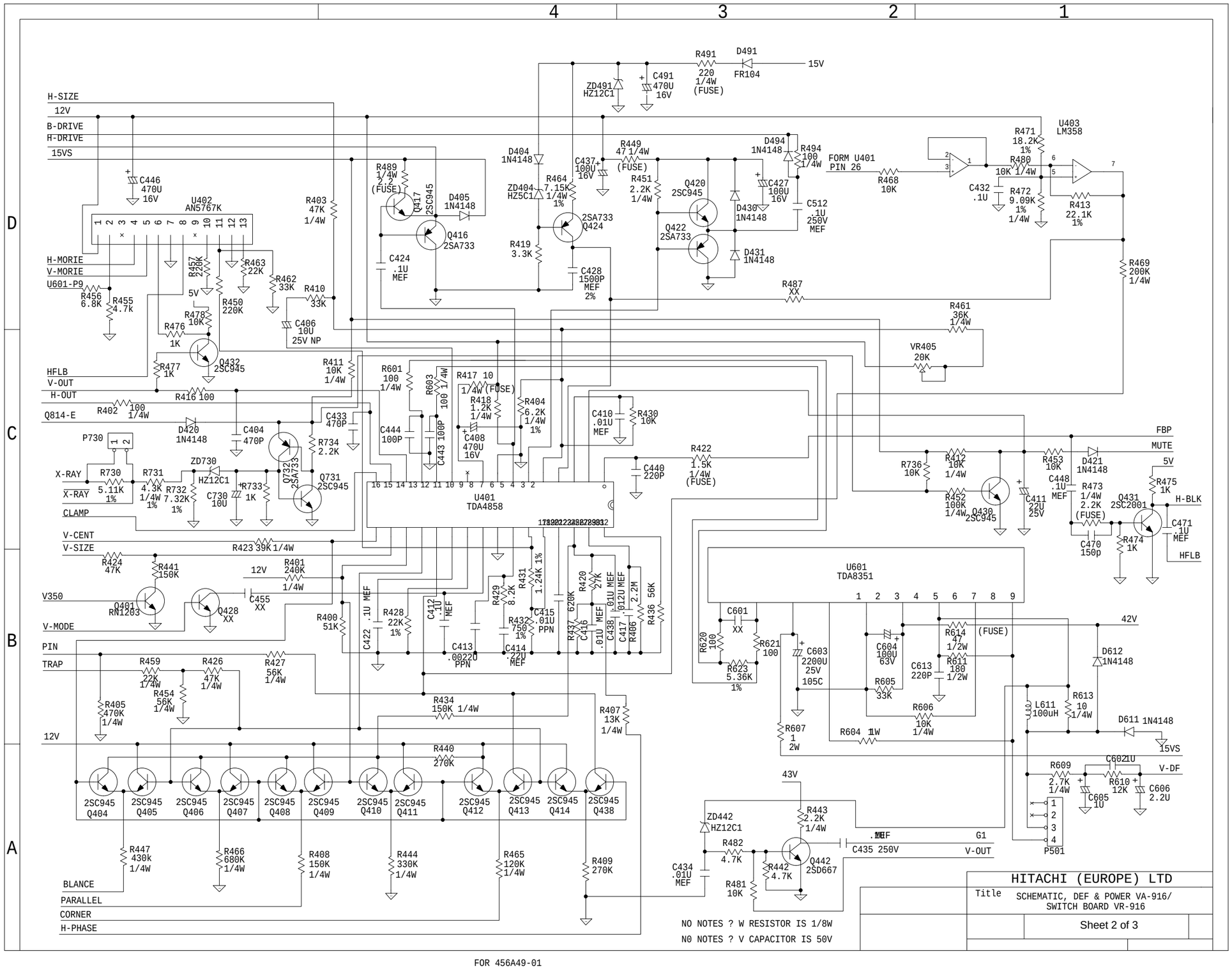
	31K-33K	33.1K-36K	36.1K-40K	40.1K-52K	52.1K-58K	58K-66K	66K-76K	76K-89K	89K-
SW1	L	H	L	L	H	L	L	H	H
SW2	L	L	H	L	L	H	H	H	H
SW3	L	L	L	H	H	H	H	H	H
SW4	L	H	H	H	H	H	H	H	L
SW5	L	H	H	L	L	L	H	L	H



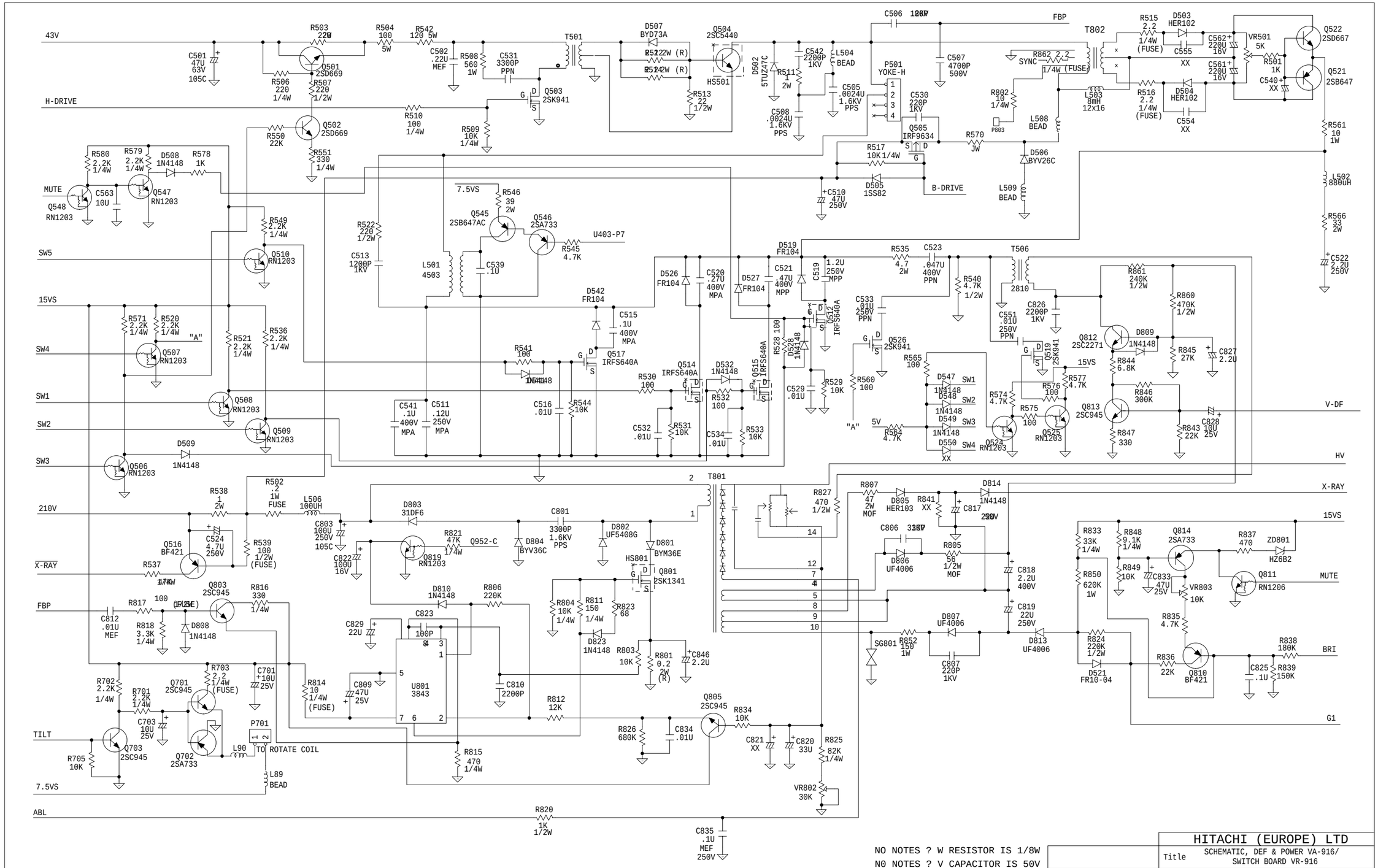
HITACHI (EUROPE) LTD

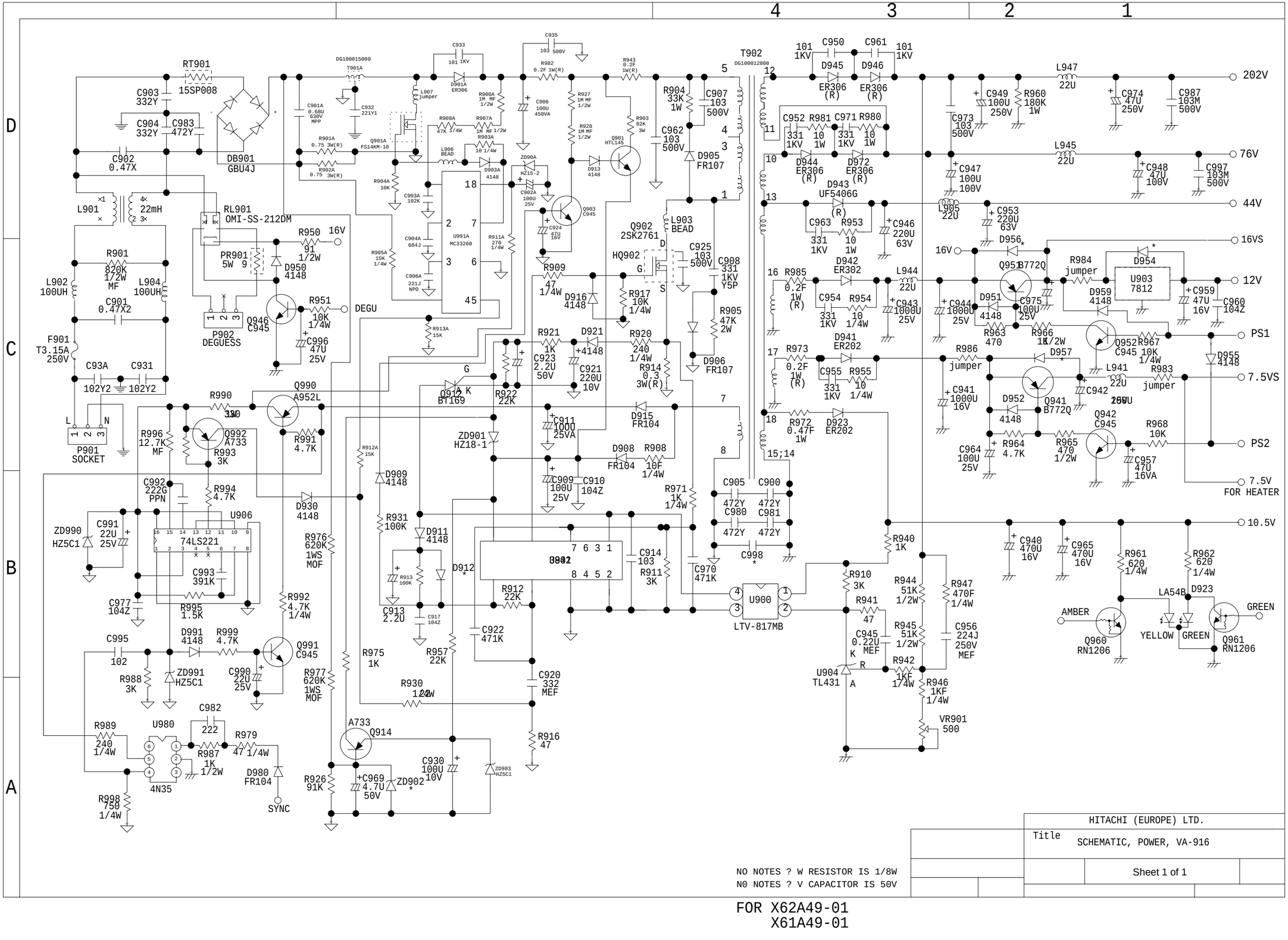
Title SCHEMATIC, DEF & POWER VA-916/ SWITCH BOARD VR-916

Sheet 1 of 3



FOR 456A49-01
446A49-01


43V
H-DRIVE
MUTE
SW5
15VS
SW4
SW1
SW2
SW3
210V
X-RAY
FBP
TILT
7.5VS
ABL
R503 220
R504 100 5W
R542 120 5W
C501 47U 63V 105C
C502 .22U MEF
R508 560 1W
C531 3300P PPN
T501
D507 BYD73A
R512 2W (R)
R514 2W (R)
Q504 2SC5440
HS501
D502 5TUZ47C
R511 1 2W
C542 2200P 1KV
L504 BEAD
C505 .0024U 1.6KV PPS
C508 .0024U 1.6KV PPS
C506 1KV
P501 YOKE-H
C507 4700P 500V
C530 220P 1KV
Q505 IRF9634
R517 10K 1/4W
D505 1SS82
+C510 47U 250V
B-DRIVE
FBP
T802
R862 2.2 SYNC 1/4W (FUSE)
R515 2.2 1/4W (FUSE)
D503 HER102
C555 XX
C562+ 220U 16V
C561+ 220U 16V
VR501 5K
R501 1K
C540+ XX
Q522 2SD667
Q521 2SB647
R802 10 1/4W
P803
L508 BEAD
L503 8mH 12x16
R516 2.2 1/4W (FUSE)
D504 HER102
C554 XX
R561 10 1W
L502 880uH
R566 33 2W
C522 2.2U 250V
R570 JW
D506 BYV26C
L509 BEAD
R580 2.2K 1/4W
R579 2.2K 1/4W
D508 1N4148
R578 1K
Q548 RN1203
C563 10U
Q547 RN1203
R549 2.2K 1/4W
Q510 RN1203
R550 22K
Q502 2SD669
R551 330 1/4W
R510 100 1/4W
R509 10K 1/4W
R503 220
Q501 2SD669
R506 220 1/4W
R507 220 1/2W
7.5VS
R546 39 2W
Q545 2SB647AC
Q546 2SA733
R545 4.7K
U403-P7
R522 220 1/2W
C513 1200P 1KV
L501 4503
C539 .1U
D542 FR104
C515 .1U 400V MPA
IRFS640A
R541 100
D541 1N4148
Q517 IRFS640A
C516 .01U
R544 10K
C541 .1U 400V MPA
C511 .12U 250V MPA
D526 FR104
C520 .27U 400V MPA
D527 FR104
C521 .47U 400V MPP
D519 FR104
C519 1.2U 250V MPP
Q512 IRFS640A
R528 100
D528 1N4148
R530 100
Q514 IRFS640A
D532 1N4148
R532 100
Q515 IRFS640A
R531 10K
C532 .01U
C534 .01U
R533 10K
C529 .01U
R529 10K
R535 4.7 2W
C523 .047U 400V PPN
C533 .01U 250V PPN
R540 4.7K 1/2W
T506
2810
C826 2200P 1KV
C551 .01U 250V PPN
Q526 2SK941
R560 100
"A"
5V
R564 4.7K
R565 100
D547 1N4148 SW1
D548 1N4148 SW2
D549 1N4148 SW3
D550 1N4148 SW4
XX
Q519 2SK941
R574 4.7K
R575 100
R576 100
R577 4.7K
Q524 RN1203
Q525 RN1203
15VS
R861 240K 1/2W
R860 470K 1/2W
Q812 2SC2271
D809 1N4148
R844 6.8K
R845 27K
C827 2.2U
R846 300K
Q813 2SC945
R847 330
R843 22K
C828 10U 25V
V-DF
HV
X-RAY
15VS
MUTE
BRI
G1
R807 47 2W MOF
R827 470 1/2W
D805 HER103
R841 XX
D814 1N4148
C817 250V
C806 1KV
D806 UF4006
R805 56 1/2W MOF
C818 2.2U 400V
C819 22U 250V
D807 UF4006
D813 UF4006
SG801
R852 150 1W
C807 220P 1KV
R833 33K 1/4W
R848 9.1K 1/4W
Q814 2SA733
R837 470
ZD801 HZ6B2
R850 620K 1W
R849 10K
C833 47U 25V
VR803 10K
Q811 RN1206
R835 4.7K
R824 220K 1/2W
D521 FR10-04
R836 22K
Q810 BF421
C825 .1U
R838 180K
R839 150K
R538 1 2W
R502 .2 1W FUSE
L506 100UH
C803 100U 250V 105C
C822 100U 16V
Q516 BF421
C524 4.7U 250V
R539 100 1/2W (FUSE)
R537 1K 1/4W
D803 31DF6
R821 47K 1/4W
Q952-C
D804 BYV36C
C801 3300P 1.6KV PPS
D802 UF5408G
D801 BYM36E
HS801
Q801 2SK1341
R804 10K 1/4W
R811 150 1/4W
R823 68
D823 1N4148
R803 10K
R801 0.2 2W (R)
C846 2.2U
T801
Q803 2SC945
R816 330 1/4W
R817 100 (1/2W)
C812 .01U MEF
R818 3.3K 1/4W
D808 1N4148
D810 1N4148
R806 220K
C823 100P
C829 22U
C809 47U 25V
U801 3843
C810 2200P
R812 12K
R814 10 1/4W (FUSE)
C701 10U 25V
R703 2.2 1/4W (FUSE)
Q701 2SC945
R702 2.2K 1/4W
R701 2.2K 1/4W
C703 10U 25V
Q703 2SC945
R705 10K
Q702 2SA733
L90
P701
TO ROTATE COIL
L89 BEAD
R815 470 1/4W
Q805 2SC945
R834 10K
R826 680K
C834 .01U
C821 XX
C820 33U
R825 82K 1/4W
VR802 30K
R820 1K 1/2W
C835 .1U MEF 250V
NO NOTES ? W RESISTOR IS 1/8W
N0 NOTES ? V CAPACITOR IS 50V
HITACHI (EUROPE) LTD
Title
SCHEMATIC, DEF & POWER VA-916/
SWITCH BOARD VR-916
Sheet 3 of 3
FOR 456A49-01
446A49-01



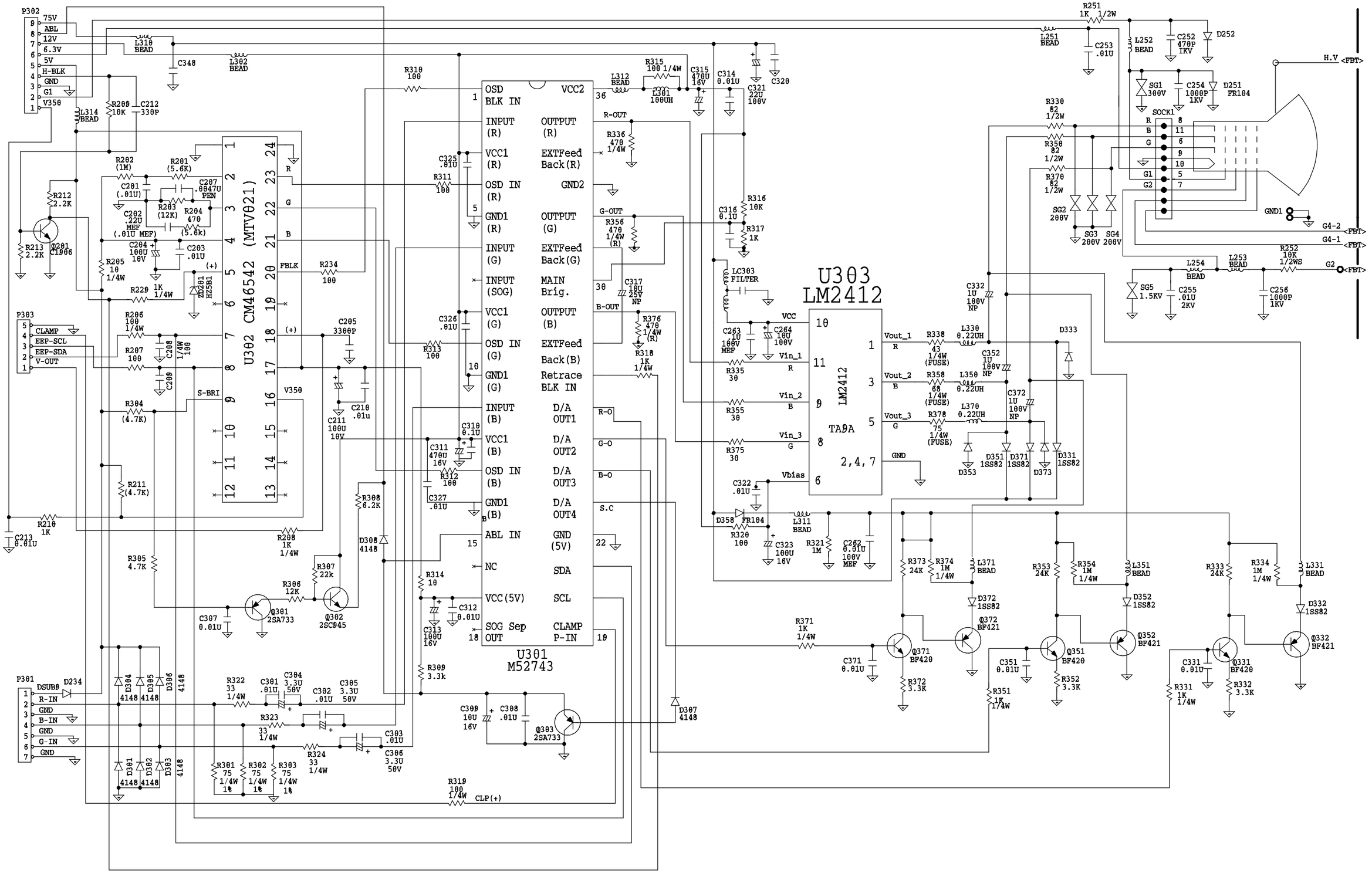
NO NOTES ? W RESISTOR IS 1/8W
N0 NOTES ? V CAPACITOR IS 50V

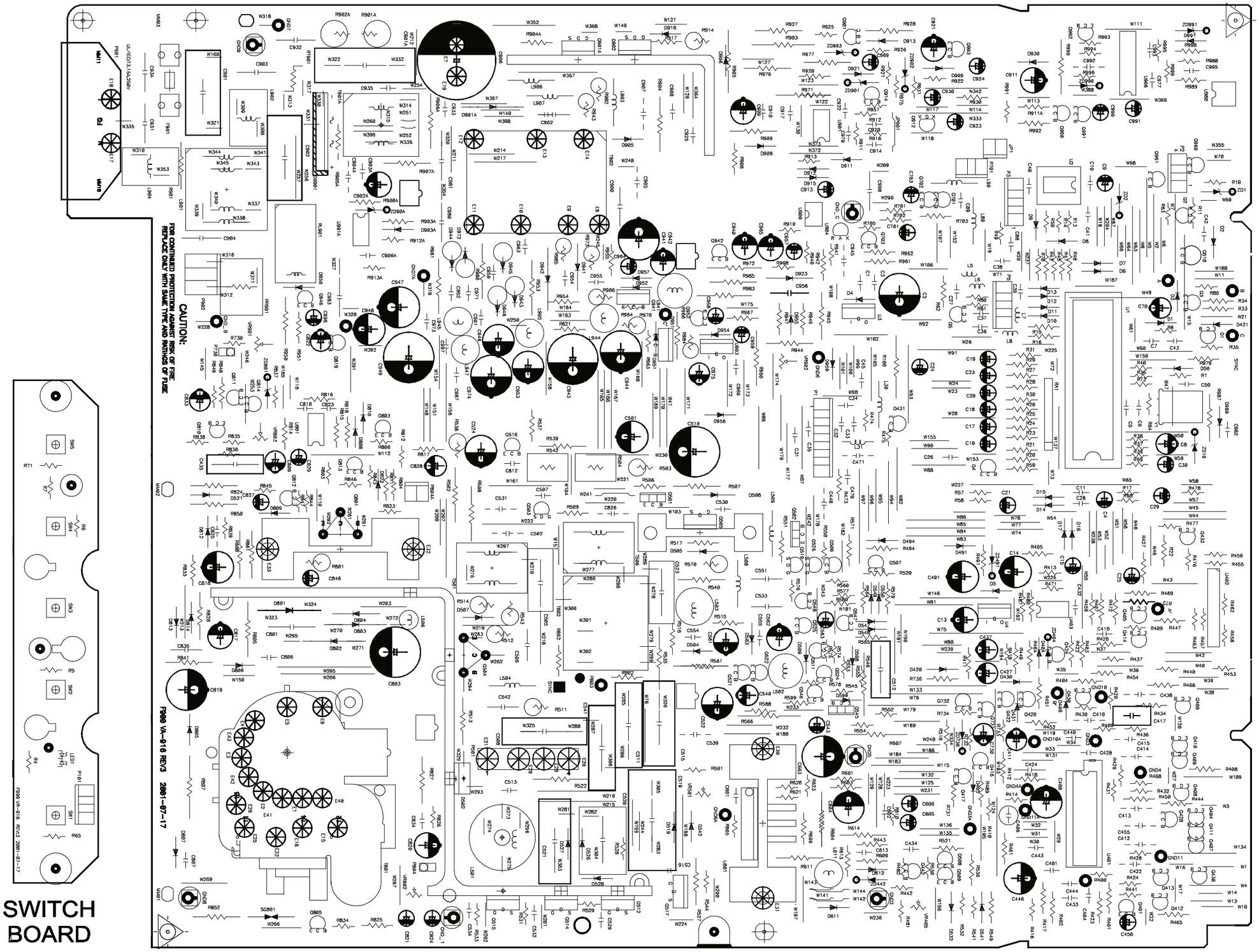
HITACHI (EUROPE) LTD.

Title: SCHEMATIC, POWER, VA-916

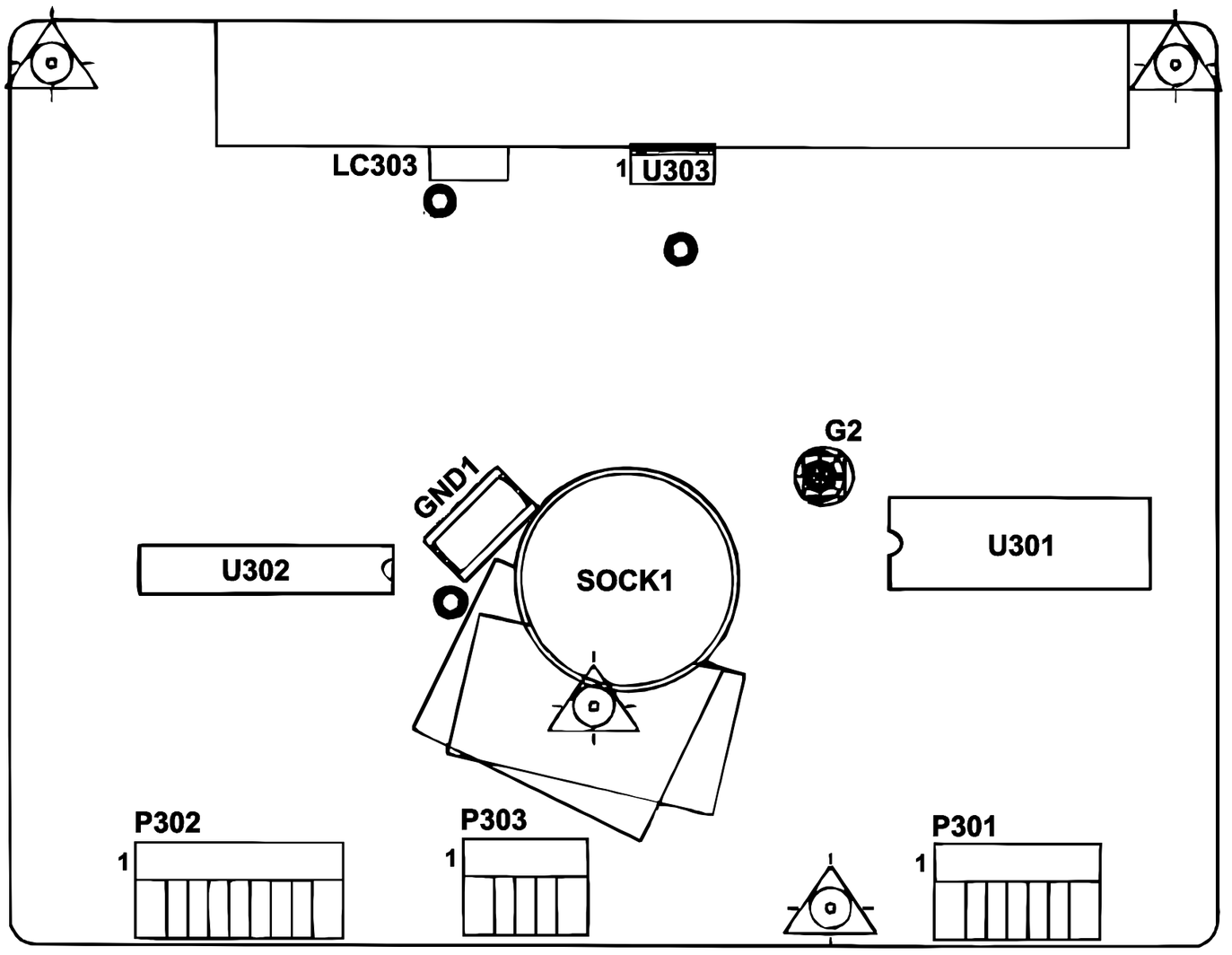
Sheet 1 of 1

FOR X62A49-01
X61A49-01


P302
75V
ABL
12V
6.3V
5V
H-BLK
GND
G1
V350
L318 BEAD
C348
L302 BEAD
L314 BEAD
R209 10K
C212 330P
U302 CM46542 (MTV021)
R202 (1M)
R201 (5.6K)
C201 (.01U)
C207 .0047U PEN
R203 (12K)
R204 470 (5.6k)
C202 .22U MEF (.01U MEF)
R212 2.2K
R213 2.2K
Q201 C1906
C204 100U 10V
C203 .01U
R205 10 1/4W
ZD201 HZ5B1
R229 1K 1/4W
P303
CLAMP
EEP-SCL
EEP-SDA
V-OUT
R206 100 1/4W
C208 1/4W 100
R207 100
C209
S-BRI
R304 (4.7K)
R211 (4.7K)
R210 1K
C213 0.01U
R305 4.7K
R208 1K 1/4W
R307 22k
R306 12K
Q301 2SA733
Q302 2SC945
C307 0.01U
D308 4148
R308 6.2K
C205 3300P
C211 100U 10V
C210 .01u
V350
R310 100
R311 100
R313 100
R312 100
C327 .01U
C325 .01U
C326 .01U
C310 0.1U
C311 470U 16V
U301 M52743
OSD BLK IN
INPUT (R)
VCC1 (R)
OSD IN (R)
GND1 (R)
INPUT (G)
INPUT (SOG)
VCC1 (G)
OSD IN (G)
GND1 (G)
INPUT (B)
VCC1 (B)
OSD IN (B)
GND1 (B)
ABL IN
NC
VCC(5V)
SOG Sep OUT
VCC2
OUTPUT (R)
EXTFeed Back(R)
GND2
OUTPUT (G)
EXTFeed Back(G)
MAIN Brig.
OUTPUT (B)
EXTFeed Back(B)
Retrace BLK IN
D/A OUT1
D/A OUT2
D/A OUT3
D/A OUT4
GND (5V)
SDA
SCL
CLAMP P-IN
R-O
G-O
B-O
S.C
R234 100
R314 10
C312 0.01U
C313 100U 16V
R309 3.3k
C309 10U 16V
C308 .01U
Q303 2SA733
D307 4148
P301
DSUB9
R-IN
GND
B-IN
GND
G-IN
GND
D234
D304 4148
D305 4148
D306 4148
D301 4148
D302 4148
D303 4148
R322 33 1/4W
C301 .01U
C304 3.3U 50V
C302 .01U
C305 3.3U 50V
R323 33 1/4W
R324 33 1/4W
C303 .01U
C306 3.3U 50V
R301 75 1/4W 1%
R302 75 1/4W 1%
R303 75 1/4W 1%
R319 100 1/4W
CLP(+)
L312 BEAD
R315 100 1/4W
L301 100UH
C315 470U 16V
C314 0.01U
C321 22U 100V
C320
R336 470 1/4W
R356 470 1/4W (R)
C317 10U 25V NP
R376 470 1/4W (R)
R318 1K 1/4W
R316 10K
C316 0.1U
R317 1K
LC303 FILTER
C263 .1U 100V MEF
C264 10U 100V
R335 30
R355 30
R375 30
C322 .01U
D358 FR104
R320 100
C323 100U 16V
L311 BEAD
R321 1M
C262 0.01U 100V MEF
U303 LM2412
VCC
Vin_1 R
Vin_2 B
Vin_3 G
Vbias
GND
TA9A
2,4,7
Vout_1 R
Vout_2 B
Vout_3 G
R338 43 1/4W (FUSE)
R358 68 1/4W (FUSE)
R378 75 1/4W (FUSE)
L330 0.22UH
L350 0.22UH
L370 0.22UH
C332 1U 100V NP
C352 1U 100V NP
C372 1U 100V NP
D333
D353
D351 1SS82
D371 1SS82
D373
D331 1SS82
R251 1K 1/2W
L251 BEAD
C253 .01U
L252 BEAD
C252 470P 1KV
D252
SG1 300V
C254 1000P 1KV
D251 FR104
H.V <FBT>
SOCK1
R
B
G
G1
G2
GND1
G4-2 <FBT>
G4-1 <FBT>
G2 <FBT>
R330 82 1/2W
R350 82 1/2W
R370 82 1/2W
SG2 200V
SG3 200V
SG4 200V
L254 BEAD
L253 BEAD
R252 10K 1/2WS
SG5 1.5KV
C255 .01U 2KV
C256 1000P 1KV
R371 1K 1/4W
Q371 BF420
R372 3.3K
C371 0.01U
R373 24K
R374 1M 1/4W
L371 BEAD
D372 1SS82
Q372 BF421
C351 0.01U
R351 1K 1/4W
Q351 BF420
R352 3.3K
R353 24K
R354 1M 1/4W
L351 BEAD
D352 1SS82
Q352 BF421
R331 1K 1/4W
C331 0.01U
Q331 BF420
R332 3.3K
R333 24K
R334 1M 1/4W
L331 BEAD
D332 1SS82
Q332 BF421


CAUTION:
FOR CONTINUED PROTECTION AGAINST RISK OF FIRE
REPLACE ONLY WITH SAME TYPE AND RATINGS OF FUSE
P300 VA-916 REV3 2001-07-17

SWITCH BOARD

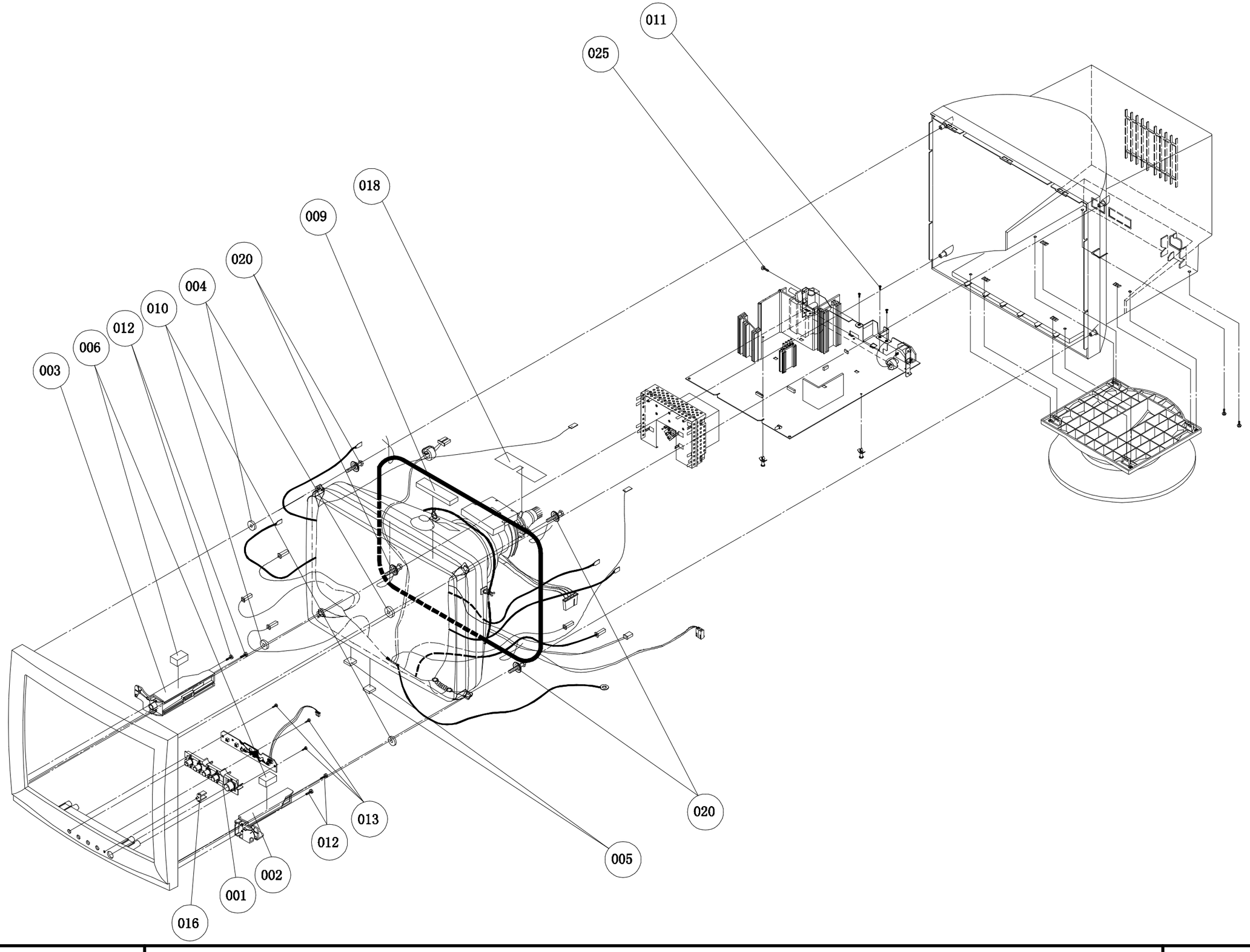

LC303
1
U303
G2
GND1
U302
SOCK1
U301
P302
1
P303
1
P301
1

THE UPDATED PARTS LIST

FOR THIS MODEL IS

AVAILABLE ON ESTA

APPENDIX C: DISPLAY UNIT ASSEMBLY



No. 0410	Monitor Assembly	HITACHI

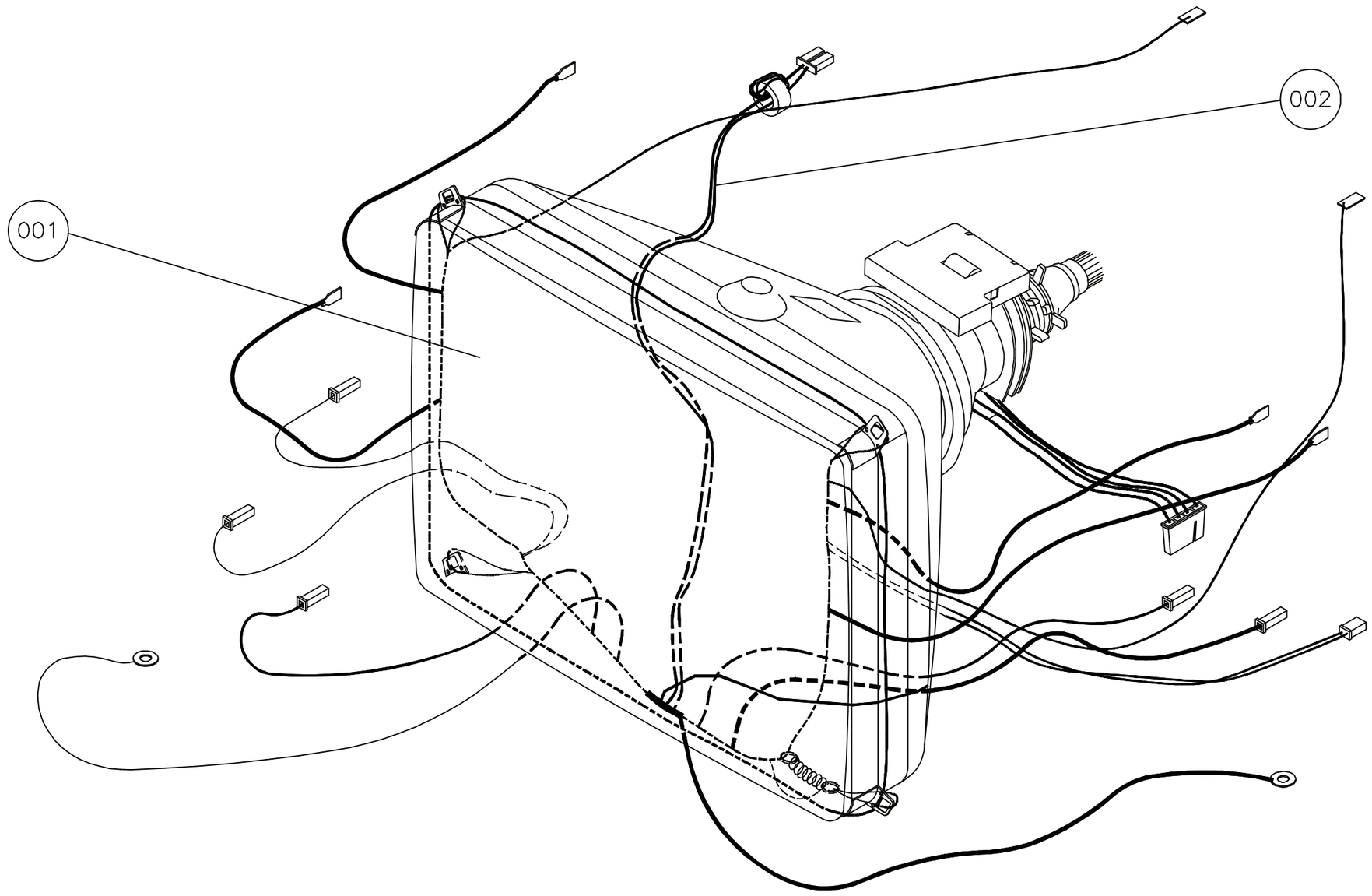
Monitor Assembly

001	FUNCTION KNOB V99921-1 ABS 94HB WG017
001	FUNCTION KNOB V99921-1 ABS 94HB MCG18
002	PCB HOLDER(L) M98021 WG017 ABS
002	PCB HOLDER(L) M98021 WG017 ABS+PC
003	PCB HOLDER(R) M98022 WG017 ABS
003	PCB HOLDER(R) M98022 WG017 ABS+PC
004	RUBBER WASHER M98042 t=5.5-1.6
005	RUBBER PAD M9904F
006	RUBBER PAD(HEATSINK) M9904G
007	COPPER PAPER CBEZEL H9931-1
008	LOCKING CABLE TIE 142MM
009	CUSHION 2 H76748
010	RUBBER WASHER F56146 (T=4.0MM SHORE:50)
011	SCREW M4X0.7+8CF-MC(EX.LOCK WASHER)
012	TAPPING SCREW TPB 4+20N-MC
013	SCREW TPP-3+10C-MC
016	POWER LED LENS V99941
017	LOCKING CABLE TIE W2.5XL203 WHITE (YJ-203S)
018	COPPER PAPER (CRT) H99944
020	SCREW TPB-5+24P-MC
025	SCREW TPP-3+6C-MC
M01	SCREW M4X0.7+8C-MC
M02	SCREW M4X0.7+8P-MC (ADD WASHER)
M03	SCREW TPB-3+8 P-UC
MB1	SCREW TPB-3+8C-MC
MB2	SCREW TPB-3+8C-MC
MB3	SCREW TPB-3+8C-MC
MP01	SCREW TPB-4+8C-MC
MP02	SCREW TPB-4+8C-MC
MXX	SCREW M4X0.7+8P-MC (ADD WASHER)

APPENDIX D: CRT & YOKE ASSEMBLY

CRT&YOKE Assembly

001	CRT & YOKE M46QCK761X123 SAM AC500025600
002	H-CON SET H999 CRT-GND AROUND W5.6 DC020133320



No. 0410	CRT and Yoke Assembly	HITACHI

HITACHI

Hitachi, Ltd. Tokyo, Japan
International Sales Division
THE HITACHI ATAGO BUILDING,
No. 15 –12 Nishi Shinbashi, 2 – Chome,
Minato – Ku, Tokyo 105-8430, Japan.
Tel: 03 35022111

HITACHI EUROPE LTD,
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire
SL6 8YA
UNITED KINGDOM
Tel: 01628 643000
Fax: 01628 643400
Email: **consumer-service@hitachi-eu.com**

HITACHI EUROPE S.A.
364 Kifissias Ave. & 1, Delfon Str.
152 33 Chalandri
Athens
GREECE
Tel: 1-6837200
Fax: 1-6835964
Email: **service.hellas@hitachi-eu.com**

HITACHI EUROPE GmbH
Munich Office
Dornacher Strasse 3
D-85622 Feldkirchen bei München
GERMANY
Tel: +49-89-991 80-0
Fax: +49-89-991 80-224
Hotline: +49-180-551 25 51 (12ct/min)
Email: **HSE-DUS.service@hitachi-eu.com**

HITACHI EUROPE S.A.
Gran Via Carlos III, 101-1
08028 Barcelona
SPAIN
Tel: 93 409 2550
Fax: 93 491 3513
Email: **atencion.cliente@hitachi-eu.com**

HITACHI EUROPE srl
Via Tommaso Gulli N.39, 20147
Milano, Italia
ITALY
Tel: +39 02 487861
Tel: +39 02 38073415 Servizio Clienti
Fax: +39 02 48786381/2
Email: customerservice.italy@hitachi-eu.com

HITACHI Europe AB
Box 77 S-164 94 Kista
SWEDEN
Tel: +46 (0) 8 562 711 00
Fax: +46 (0) 8 562 711 13
Email: **csgswe@hitachi-eu.com**

HITACHI EUROPE S.A.S
Lyon Office
B.P. 45, 69671 BRON CEDEX
FRANCE
Tel: 04 72 14 29 70
Fax: 04 72 14 29 99
Email: **france.consommateur@hitachi-eu.com**

HITACHI EUROPE LTD (Norway) AB
STRANDVEIEN 18
1366 Lysaker
NORWAY
Tel: 67 5190 30
Fax: 67 5190 32
Email: **csgnor@hitachi-eu.com**

HITACH EUROPE AB
Egebækgård
Egebækvej 98
DK-2850 Nærum
DENMARK
Tel: +45 43 43 6050
Fax: +45 43 60 51
Email: **csgnor@hitachi-eu.com**

HITACHI EUROPE AB
Neopoli / Niemenkatu 73
FIN-15140 Lahti
FINLAND
Tel : +358 3 8858 271
Fax: +358 3 8858 272
Email: **csgnor@hitachi-eu.com**

Hitachi Europe Ltd
Bergensesteenweg 421
1600 Sint-Pieters-Leeuw
BELGIUM
Tel: +32 2 363 99 01
Fax: +32 2 363 99 00
Email: **sofie.van.bom@hitachi-eu.com**

HITACHI EUROPE LTD
Na Sychrove 975/8
101 27 Praha 10 – Bohdalec
CZECH REPUBLIC
Tel: +420 267 212 383
Fax: +420 267 212 385
Email: **csgnor@hitachi-eu.com**

www.hitachidigitalmedia.com